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THE IRON AGE

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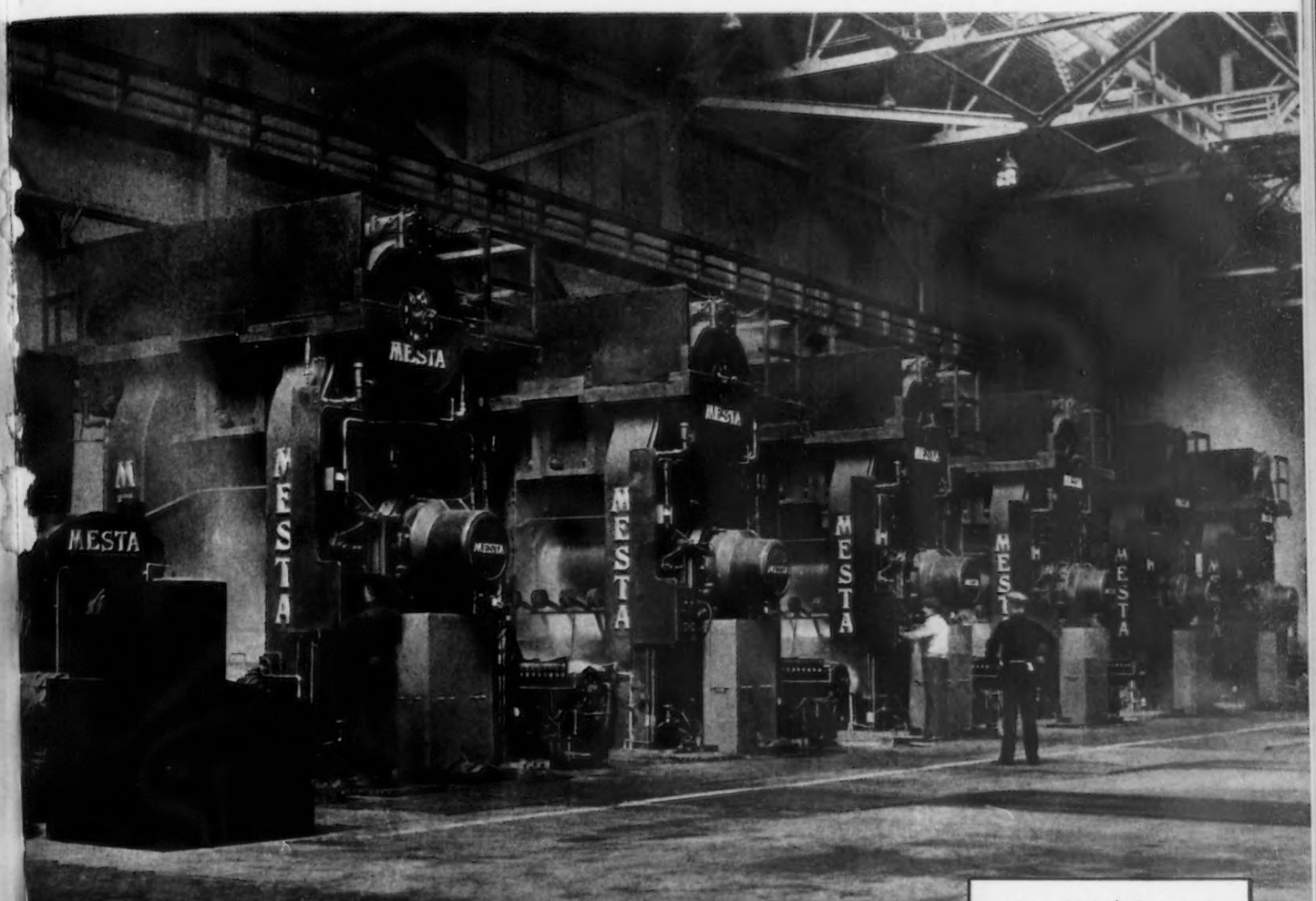

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IRON AGE

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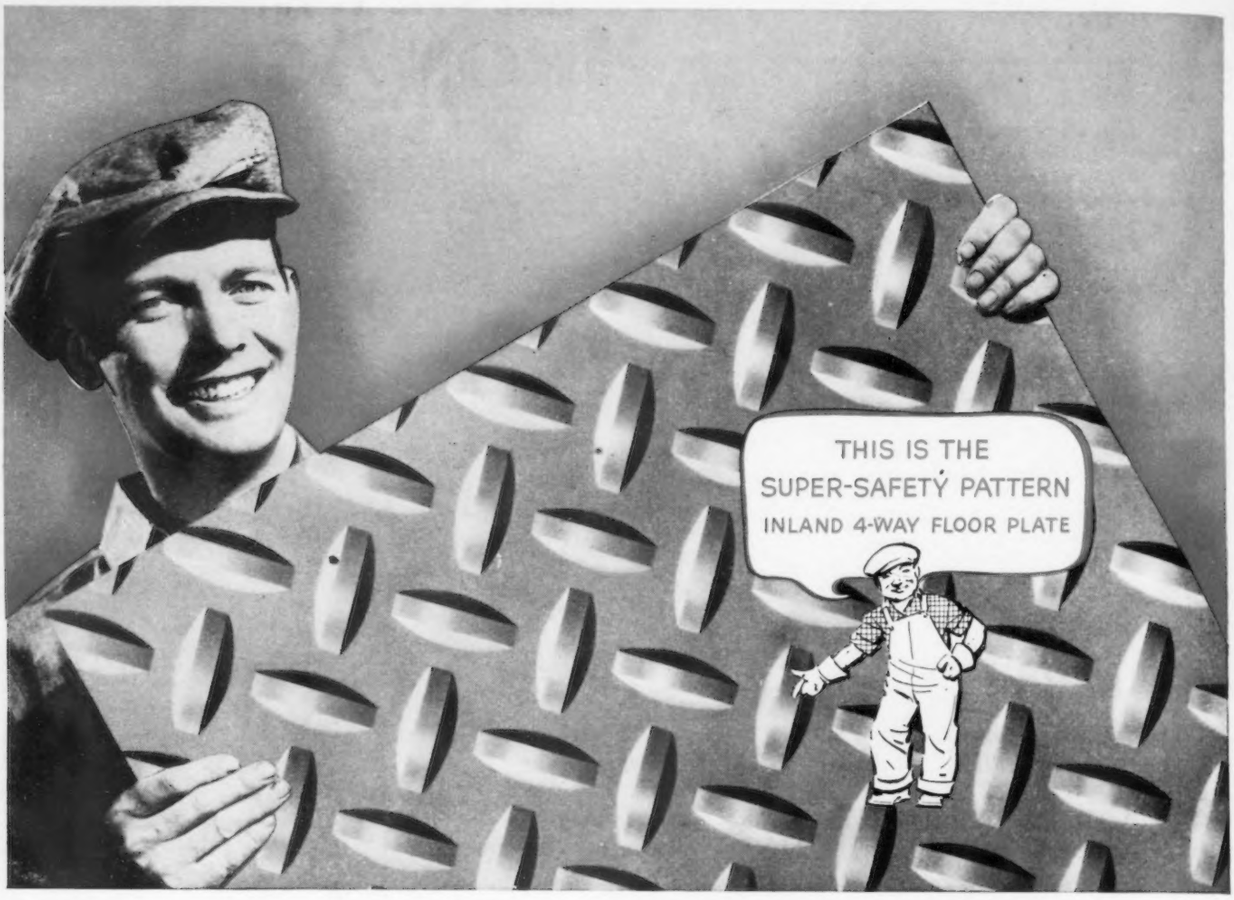

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Page the Indians

PAGE the Indians. Send out an SOS for the survivors of the Shawnees, the Mohawks, the Senecas, the Mohicans, the Iroquois, the Apaches, the Blackfeet and the dozens of other tribes whose descendents can claim to be the only native Americans.

We have a job for them to do.

It's a tough job that needs doing and is not being done by those whom we have put in position to do it. It's the job of running this country.

Yes, we have people who are supposed to do it. Administrative officers and Congressmen have been elected to run America for the Americans but they have abdicated in favor of individuals like Lewis, Petrillo, Hillman and other high-binders who have frightened them with threats of ambushcade at election time.

Imagine any Indian chief or elder of the tribe being frightened by the chin wagging of kibitzers of this category!

Imagine any self-respecting chief or council member permitting one tenth of one percent of the tribe to immobilize the remaining 99 9/10 by preventing them access to the canoes or horses needed for transportation. Or preventing them from building fires unless their demands were met.

Bring back the Indians. They would know how to handle such situations promptly and effectively.

That doesn't mean that minorities with a real grievance could not get a hearing and justice when and where needed. But the hearings were public ones, around the council fire, and when the fact finders had reported and the council decided what should be done, there were no two ways about it.

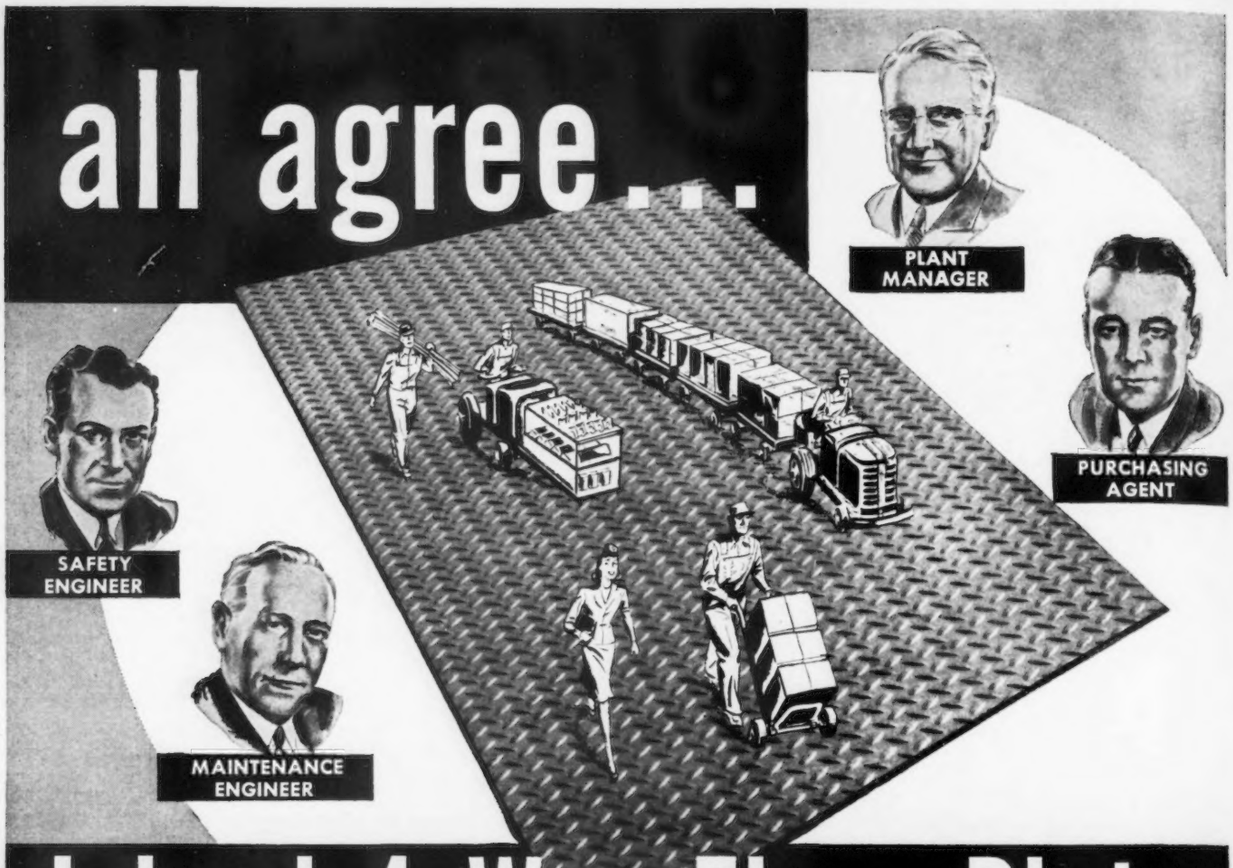
No self-respecting chief would make individual deals with tribe members. If there had been a John Lewis in those days, and the Indians would have accepted him as a tribe member, which is doubtful, he could never have side-tracked the council and obtained permission from the chief to raid the tribe's wampum chest.

If little Petrillo had been an Indian then and could find a tribe low enough to accept him as a member he could not have prevented the tom-tom players from beating their drums or the amateur vocalists from chanting at the tribal dances.

Basically, the American Indians were a peaceable people who believed in a world of tolerance and freedom. They knew how to enjoy life and nature in simple ways, which is more than can be said today for the white man. When forces either outside or inside the tribe began to endanger their freedom, the Indians had the courage to fight individually and collectively to preserve and protect it, which is also more than can be said for the majority of Americans of today.

Let's hand America back to the Indians. But perhaps they would not want it in the shape it's in now.

all agree . . .



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SAFETY ENGINEERS can breathe a sigh of relief when slippery, dangerous floors are covered with Inland 4-Way Floor Plate. They know that, installed on floors, ramps, walkways, steps, platforms or any place where slips or falls may occur, it provides a safe surface that prevents slipping and falling.

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► Reports have increased in the steel trade that some companies are making tie-in sales. In order to get cold-rolled sheets, consumers, in numerous instances, are being asked to take a stipulated tonnage of alloy steel. This is being done, of course, very quietly.

► It now appears that Henry Kaiser will be able to fill in his shortage of sheets for the Kaiser-Frazer cars with his investment in the Portsmouth plant of Wheeling Steel. The Midwest steel company previously mentioned now turns out to be a company which has purchased the Portsmouth plant and the Kaiser-Frazer Co. will be substantial stockholders.

Sheet bars made at this plant will be rolled into sheets at Wheeling Steel Corp's Steubenville, Ohio, plant and the balance of requirements are expected to be processed from Fontana ingots at the Great Lakes Steel plant.

► Legislative committees are trying to put the heat on CPA to restore steel allocations. The latter, however, has shown little rise in temperature, since it feels that there is no alchemist's stone to convert what has been lost into available steel.

Secretary of the Interior Krug says that during the five war years, 1941 through 1945, we produced 7.5 billion bbl of oil; 5 million short tons of copper; 2.25 million short tons of lead; 3.5 million short tons of zinc; 200,000 flasks of mercury; 9,000 short tons of contained vanadium; and 20,000 short tons of tungsten.

► Introduction of the 2-million volt X-ray unit makes possible the radiography of a number of different metal thicknesses in a single exposure, thus eliminating time consuming blocking. Also high radiographic sensitivity over the thickness range ¼ to 12 in. can be achieved.

Three types of ultra-high voltage X-ray generators now in use are the low frequency resonance transformer, the Van de Graaff electrostatic generator and the induction accelerator or betatron.

► Two major impediments to supersonic speeds in aircraft are power plant developments and high temperature materials. Model rocket-powered planes have already been built and tested in wind tunnels under conditions simulating air speeds of about 4500 mph, or seven times the speed of sound.

Newest type aircraft engine is the ramjet, capable of operating at higher speeds and at greater altitudes than any present power plant with the exception of rockets. Compression of air in the engine is obtained by converting the kinetic energy of moving air into pressure energy, then igniting this compressed air and boosting its velocity as it leaves the jet. However, this type engine requires high speeds for operation and some other form of power plant is necessary to establish the initial speed.

► A technique for the continuous weight analysis of metallic specimens subjected to oxidation tests has been worked out at the Ontario Research Foundation, Ontario, Canada.

Connected to an automatic recorder, both increase and decrease in weight of specimen is recorded. Highlight is that as soon as any friable oxide scale drops off specimen, loss in weight is immediately noted on chart.

► A British marine biologist expects the tidal waters of the Thames at London to "foam and bubble" within minutes of the explosion of the atom bomb at Bikini. He explained that he expected the explosion to have repercussions on the small quantities of uranium in all sea water.

► Since the first of the year exports of British goods have risen steadily by 7 pct each month. Figures for iron and steel, machine tools, farm machinery, cars and railway rolling stock have already topped those for 1938.

► French machinery manufacturers in the past 12 months have produced 15,000 metalworking machines and 5000 woodworking machines, but pressure for even greater deliveries continues strong.

Latest estimate of the age of the 550,000 to 590,000 metalworking machines in France is 27 to 30 yr.

► Sheet steel capacity on the West Coast will be increased by 50,000 to 60,000 tons according to plans of the Seidelhuber Iron & Bronze Works of Seattle. Billets will be purchased.

► Although there has been some investigation into the characteristics of byproduct coke, foundries would like additional information on its hot strength, rate of heat production per unit, character of slagability, manner of bridging in cupolas, flow of hot and cold coke of various size through the stack, and the solubility of coke in iron.

► At the end of the war the Czechoslovak work day was from 6 a.m. to 2 p.m. Then they would go to work on the reinforced concrete rubble to break out the reinforcing steel for use as scrap.

Fission

o o o

By T. W. LIPPERT

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BACK in 1921 when Gen. Billy Mitchell managed to drop some 2000-lb bombs from a Martin bomber alongside the German dreadnaughts Ostfriesland and Frankfurt, everything was ever so much simpler. The Yanks had been back for some time from showing the Allies how to win a world war. There were going to be no more wars. The American military had been chopped down to an impotent and rather scorned cadre of diehard professionals. The airplane was still an expensive and undependable military toy. The mere fact that an excessively garrulous air general, after several days, finally succeeded in driving a capital ship to the bottom of the ocean while some admirals huffed and puffed disdainfully, hardly stirred newspaper heads. And, in those days there were no newspaper columnists and no breathless radio commentators at 15-min intervals to whip up popular interest. To those people who happened to study the pronouncements it all seemed moderately academic, a theoretical intramural squabble of military groups with little else to occupy their attention. Something on the order of the medieval theological quodlibet as to how many angels could dance upon the point of a needle.

But no such general indifference marks the exploding of the world's fourth atomic bomb some 17 days from now, a few hundred feet above an aggregation of 74 ships parked within Bikini lagoon, in the Marshalls a few degrees north of the equator—some 2000 miles from Japan and 3500 miles from San Francisco.

At no time in the world's history has there ever been even a fraction of the eyes and ears trained on one happening as when some yet unnamed bombardier touches a release button over Bikini lagoon. Hundreds of eyes will be watching four television screens showing a close-up of the lagoon, on the deck of Admiral Blandy's flagship and on the two observer ships and on the press ship; on the decks other thousands of eyes will watch for the plume of flame; in the air hundreds of men will swing into action with cameras and broadcasting equipment; in the United States possibly some hundred million people will be at their radios; elsewhere in the world there will be flickers of concentrated interest, and two days later some 2 in. of carefully edited words will likely appear on some inside page of a few Russian newspapers to mystify a populace that has been carefully shielded from the alarm and despondency generated elsewhere in the world by prophecies of impending atomic doom.

This Crossroads Operation has been badly buffeted by the floods of conflicting moral, political, technical, military and materialistic opinions competing for attention ever since the bomb's premiere in New Mexico just a year ago. Aghast at its horrific potential to decimate the world, the intellectual seeks to rationalize some path to survival, while at the same time the usual fringe of fuzzy mentalities comes up with the customary obscure idiocies. Staggered and awed by being the possessors of this radical new weapon, it is in the United States where most discussion rages, for elsewhere in the world the last year has been such a struggle for day-to-day survival as to discourage concern for long-range survival.

The bulk of people in the United States have tended to slide progressively into a rather hopeless lethargy, baffled as they are by volumes of conflicting opinion which in no way blur the overwhelming threat of atomic warfare as the inevitable climax of a deteriorating world political situation, wherein even the simplest of conflicting interests seem to elude settlement.

Observations on the atomic bomb run the gamut from the extreme of discounting it as "just another weapon," to the other extreme that the nations must promptly coalesce into a super-state or the whole world will blow up. The "just another weapon" school of thought found its most articulate spokesman in the air fanatic, Maj. Alexander P. de Seversky, who in the February *Reader's Digest* flayed officially-inspired atomic bomb hysteria and wrote off the bomb as little more than an overpublicized explosion comparable with a 10-ton blockbuster. A few days after this publication Maj. Seversky sweated it out before the Congressional Committee on Atomic Energy. After some 70 pages of testimony he wilted to the point that indicated either rank inability properly to appraise what his

at Bikini

(1) Able Day Minus Seventeen

eyes had seen at Hiroshima and Nagasaki, or deliberate intention to write a Pollyanna article acceptable to the editors of a magazine that caters to the beautiful, forebearing and genial aspects of life.

Ranging between these two extremes there are such oddities as the impassioned and befuddled full-page newspaper advertisement of Feb. 27 paid for by the Military Order of Purple Heart. On one hand the advertisements bitterly criticized the martial aspects of the test, held forth with tearful eloquence on the fate of brave American ships sentenced to suffer the ignominy of atomic destruction, and proposed their retention as a means of protection or as war-memorial shrines in various cities. Then there was Senator Huffman of Ohio, who was coming up for re-election in early May. Many a foot of first-rate pre-election newspaper type fell his way on a proposed bill to ban the tests. The Senator figured the original value of all the obsolete ships involved and arrived at a total cost he considered prohibitive, and anyhow the Navy would arrive at no worthwhile information and should go on building ships as they always had.

After a certain amount of moody introspection, more measured opinion came from the scientific fraternity. Dr. Louis Ridenour, of M.I.T., one of the younger atomic physicists, who called the test a giant boondoggle, and stated that, "if one set out to arrange conditions so that as little of value as possible could be accomplished by exploding an atomic bomb, he could scarcely do better than will be done this July at Bikini." Or, the brilliant magazine *New Yorker* which said, "nations are circling around each other like dogs that haven't been introduced, sniffing each other's behinds and keeping their hackles at alert. The whole business of the bomb tests at Bikini is a shocking bit of hackles-raising which is almost enough in itself to start a bitter fight in the crazy arena of amorphous fear." Or, the famous Russian physicist, Prof. Peter Kapitza, who pooh-poohs atomic bombs and discounts atomic energy for power purposes for at least 100 yr. (The U. S. Navy already is building an atomic power unit for submarines.) Or, the French scientist, Dr. Joliot-Curie, who lampoons the test as, "a miserable idea and a poor example to give the world. Do the sailors want to prove that perhaps one of the ships won't be turned over by the atomic bombs—and thus justify their existence?" Or, the very respectable Harvard Observatory director, Dr. Harlow Shapley, who credited the bomb test as "only a show," and in private communication said, "I would much prefer that we cancel the show and make simple engineering tests, preferably under the auspices of the Security Council. To strut our military power expensively while millions starve in Asia and Europe is one of those mistakes we shall have difficulty in living down." Or, the dialectition of the British Labor Party, Harold Laski, who recently threw out the scare that improved atomic bombs are in existence, five of which could destroy all of the United States below the Mason and Dixon Line.

The hard core of responsible concern on the atomic bomb, however, centers in that group of scientists and other citizens of good will, who like Chancellor Hutchins, of the University of Chicago, insist that the release of atomic energy has made the sovereign national state obsolete. That this original-stuff bomb (as the Chinese so aptly call it) must steadily and progressively be brought within the framework of human understanding and control, or it may well in all sober thought within a decade reverse the creation of the world whereby, "things were molded by some plastic force out of some atoms somewhere up in space fortuitously concurrent."

Major Seversky's placid opinion of the bomb to the contrary, the closer one approaches the scientists the more obvious becomes the fright that another war means the pushing back of human civilization to its primitive origins. And, even though the scientists distrust the perception of the politician and the military, it is equally obvious on closer acquaintance that the leaders in both these fields are fully as frightened.

Unfortunately the scientists are convinced that only they can intelligently ride the whirlwind they created and mold it as a safe servant of mankind. The military and the politician, meanwhile, look upon the scientists as naive and credulous blunderers of good will in the tortuous maze of human relationships, who in haste and enthusiasm for the new order might carelessly throw away the political existence of the United States without in the least creating a stable world order, unless it be a *Pax Sovietica*. The silly argument raging for these many months that the U. S. should as a gesture of international understanding give the atomic bomb secrets to Russia because Russia can soon find them out anyhow because the secrets really aren't secrets, along with the apparent efficiency of Soviet espionage among some scientists, have in no way strengthened the popular position of this group.

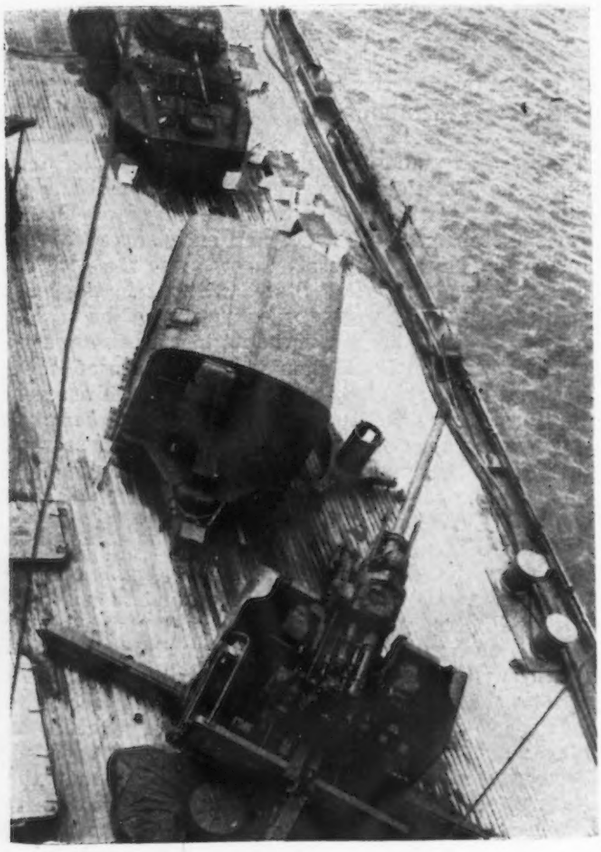
The military, on the other hand, is fortified by history in its doubt that the atomic bomb can be used just twice in earnest warfare and thenceforth outlawed. And, in the political realm, the closer those get who have the actual responsibility of negotiating with the Russians and appraising Mr. Stalin's strictly jingoistic speeches, the more firm seems to be the growing belief that atomic secrets should be played close to the chest and new research speeded. So confused is the pulling and hauling that the Federation of American Scientists has thrown its whole emotional and moral weight behind the United

Nations organization as the only hope of collective security and deplores the coming bomb test because it is based on the frightful idea that there will be an atomic war in which navies would desperately seek to survive. Their position is tempered somewhat by the cynical observation that it may take the horrors of another war to teach civilization the lesson of cooperation.

By its many pronouncements the Federation of Scientists has sought to cut the groundwork from under what it apparently thinks is a diabolic Navy plot to rig the test so that few if any ships will be lost. In fact, the Federation bluntly predicts that no capital ship will be sunk. The opinion is that thereby the Navy will lull the populace into a feeling of false security and relative disdain of the potency of atomic weapons and thereby take the steam out of any political pressure for protection on the international plane.

Just what effect all these viewpoints have had on popular opinion is impossible to say. In any case, at present writing, popular opinion as reflected by the Gallup Polls show 70 pct of the people expecting another war within 25 yr, with veterans more sure of it than older groups. Very heavy majorities favor continuance of the draft and are skeptical of any reduction of armaments by agreement between the U. S., Britain and Russia. The public majority favors continued manufacture and stockpiling of atomic bombs in the belief that other nations already are making similar bombs, but unaccountably only a bare majority thinks the Bikini bomb test should be held.

ARMY ground forces equipment lashed onto decks of target ships. Inside will be animals and testing equipment to determine the structural strength and resistance against heat and gamma rays of such equipment.



Opinion is equally divided as to whether animals should be used in the test, probably reflecting in part the widespread influence of Hearst papers which in the past year have been able to keep up a drumfire of anti-vivisection front-page headlines. Despite the conventionalized observation that the veteran who has experienced the horrors of war is a pacifist, in all these opinion samplings the veteran shows up 2 to 1 on the side of military preparedness and expectation of war. And, in general, people of college education adopt the more hopeless and cynical viewpoint than the less educated.

As to the thesis that atomic energy and nationalism cannot co-exist in the same world, that the choice is sharp and clear between a world state and destruction, the only practical stepping stone to this end is that sponsored by the U. S. State Department. It proposes a plan under which no nation would make atomic bombs or the materials for them. All production of fissionable material, such as those great operations at Hanford and Oak Ridge, would be owned by and placed under the operational control of an International Authority, and the same would apply to similar installations in other nations. This International Authority would be a live, functioning entity with a real purpose in the world and capable of attracting competent personnel. This monopoly of dangerous activities by an International Authority would still leave a large and tremendously productive field of safe activities open to individual nations, their industries and universities. Denatured fissionable material would be supplied to individual nations for power purposes and could only be converted into bomb material through the use of very large purification installations similar to the primary production plants. The mere act of operating such a plant would in itself be illegal, and proper punitive actions would be taken.

With even Iran finding the going tough to keep on the agenda, the getting of such a proposal involving mutual trust and good will on the same agenda would in itself constitute a triumph of mind over instinct. Much as cold logic and reason favor creation of such an overriding International Authority, it outrages every one of those biological instincts on which preservation of the species have been based since the dim ages.

Meanwhile, with the United Nations agenda in somewhat the state of a shambles and Mr. Andrei Gromyko's mere attendance or non-attendance at the conference table a matter of uncertain speculation, the Bikini atomic bomb test is going to be held, willy-nilly. It's a Navy show, and the Navy fully realizes that the test must be held soon or never. Preparations for the test involve great scope and enormity of effort, and the mere fact of a 6-week postponement by the President introduced a number of unexpected complicating factors. The date originally proposed promised weather that at worst would involve only a day or so of delay for the actual bomb drop, but moving the test into July brings with it uncertain weather which may delay the test several weeks for favorable conditions which at best will be accompanied by unpredictable winds which could blow the deadly plume of radioactive dust in unexpected directions. The drop-off in trained Navy personnel, due to the delay, in itself reached such proportions as to jeopardize the test. Before postponement, one ship, which is typical of all in the operational group, had

THE VIPs of Crossroads: Left foreground, Admiral T. A. Solberg, technical advisor representing the Bureau of Ships; (with pipe) Col. T. J. Betts, Assistant Chief of Staff for Intelligence; Dr. R. A. Sawyer, Chief of the Technical Staff; Rear Admiral W. S. Parsons, Deputy Task Force Commander for Technical Direction, who had much to do with the design of the atom bomb and the proximity fuse; Capt. Fitzhugh Lee, Public Information Officer; (reading) Vice Admiral W. H. P. (Spike) Blandy, Commander of Joint Army-Navy Task Force One; Maj. Gen. W. E. Kepner, Deputy Task Force Commander for Aviation; Maj. Gen. A. L. McAuliffe, Ground Forces Advisor.

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something like 400 experienced petty officers volunteer to stay for Crossroads, which dropped to 2 volunteers after the postponement. Green crews are now manning the ships and at best the operation is bound to be pretty jerky in spots with some likelihood of accidents. As to getting all the ships together for the test, the Navy knows it's now or never.

The original plan called for three tests: One on the air, probably exploding at around 500 ft; another at sea level; and a third some thousands of feet under the surface. The air test will be held first, as close to July 1 as weather permits. (There is some sentimental plugging for July 4 as an appropriate date.) The sea-level test (with the bomb on a barge) has been abandoned. In its place a bomb will be exploded at the bottom of Bikini lagoon, possibly 100 ft down, just as soon as radioactive contamination dissipates, and the target-ship array reassembled, instruments rechecked and replaced, and everything patched up a little. It is this test the Navy expects will create the most havoc. Although there has been no official announcement regarding a later deep-sea test with the bomb lowered in a high-pressure container like a bathosphere, it is likely that the Navy in private calculation has arrived at the conclusion that political and operational conditions will deteriorate to a point where it never will be held.

The Navy brass is getting a great kick out of holding the tests. As professionals they should, and as professionals the country should admit that the only reason for their existence is to plan carefully in the expectation of future wars. The creation of world peace is the obligation of the people and the politician. The Navy has smarted long and in silence under the popular criticism of their inability to think in terms other than the battleship, and spun yarn and marlin, and their congenital habit of fighting one war with the previous war's weapons. Now they are smarting with some degree of bewilderment under the accusations of warmongering when attempting to explore the potentialities of future weapons.

The Seabees have erected the television, and automatic photography and instrumentation towers on various islands surrounding Bikini lagoon. The Army ground forces have everything from field guns to tanks to K rations lashed on the decks of target ships, and the Air Corps have planes exposed on the carrier decks with gasoline in tanks and ammunition in the guns. All the target ships are now anchored in proper array, with the dreadnaught Nevada in the approximate center as aiming point and painted a brilliant orange-red. The Nevada is some 4000 yd from Bikini Island which puts the island itself on the extreme outer edge of the expected lethal area. The target ships are bunched in quite closely to the Nevada, much closer than normal anchorage in a harbor and many, many times closer than the grouping of ships in a Task Force at sea. The target grouping has to be close for the bomb pressure is only extremely high close in to the bomb, then for some little distance it drops off rapidly, then not quite so rapidly for some distance beyond that. Maximum damage to certain types of ships can only be assured by close bunching, and even at best the symmetry of damage throughout the target array will likely be distorted through inability of the bombardier to bullseye the Nevada from the extremely high altitude of his release point.

Admiral Blandy's flagship, the *Mount McKinley*, is already in the Bikini area, as are most of the other operational ships. At Kwajalein Atoll, 215 miles south, the several atomic bombs have been delivered and the B-29s and their crews have flown in. The pilotless controlled ships and drones are waiting 190 miles west at Eniwetok. The *Haven* is now en route, having left San Francisco May 29 with the President's Evaluation Commission and the Joint Chiefs of Staff Evaluation Board. The *Burleson*, also en route, left San Francisco June 1 with the test animals which will have the honor of being dressed in various protective clothing, salved with ointments and offered in sacrifice in lonesome splendor in various sections of the test ships. Yesterday, on June 12, the last three ships left San Francisco: The *Appalachian*, a wartime advance communications ship carrying some 100 assorted newspaper, magazine and feature writers; and the *Blue Ridge* and *Panamint* carrying various non-participating observers and a stack of assorted faceguards.

The confining of about 100 assorted newspaper and magazine writers for four to six weeks on one ship is itself a brave innovation, probably without precedent. Just what effect such a heterogenous assortment of strictly male extroverts, introverts and psychopaths will have on each other when crammed together within the confines of one ship and cut off from all normal supplies of alcoholic beverages, feminine entertainment and all the other usual distrac-

Justus, Minneapolis Star-Journal

tions credited to the well being of the fourth estate, will in itself be a study worthy of the instrumentation being lavished on the atom bomb. Murder and mass-suicide are within the realms of possibility. The Navy has promised nothing but heat and discomfort on this trip, and for that reason most newspapers have credited their younger men to the operation, for the most part recently demobilized veterans in their twenties. This writer, at the doddering age of 38, may in all sorrow quickly be saddled with the nickname of Pop. There have been some half-hearted attempts to inject the note of glamor or danger into the trip, but it's all a matter of self-deception to blur the certain knowledge that everything is going to be pretty dull. Even so, the ultra-conservative insurance companies share none of Major Seversky's indifference, for a $10,000 short-term accident policy at a fancy premium is the maximum procurable, which comes in rather startling comparison with unlimited amounts at lower premiums available during the war for operation even within a combat zone.

This operation enjoys a freedom from censorship far greater than anyone had expected. Newspaper observers are going to be permitted to visit ships just prior to the test and also after the test, and also have individual discretion in reporting anything they may observe during the test. They will not be able to report the height of the bomb burst, nor the exact location of the bomb burst in relation to the array of target ships, nor much of the individual test data showing up on the instruments, immediately after the test, nor how the atom bomb is put into the B-29 or how it is released, nor indicate the relative nuclear efficiency of the bomb. While a Nagasaki type of bomb will be used, there is no way of predicting with just what efficiency the nuclear reactions will be activated. The bomb may be a relative dud or may go off with ten times the intensity that leveled the center of Nagasaki. If a relative dud, another bomb will be used as soon as it can be brought into position.

The release of a few instrument readings on some ships will likely be possible, but in no way will a newspaper writer be permitted to send enough correlated information on distances of target ships one from another along with degree of wreckage in each case, so that rough calculation of a pressure curve of the bomb would be possible. As for photographs, they will be cleared only after very careful examination; for a photograph is a permanent record which can be studied at great length and under magnification, which might turn up enough bits and pieces of information to make a valuable whole piece of information of service to some potential enemy without the enemy going through the expense and difficulty of its own test.

The press ship will arrive in position outside Bikini lagoon, some 10 or 12 air miles from the target bullseye *Nevada*, on June 29, Bikini time. Two days later, on July 1 the first bomb is scheduled to drop at 9:30 in the morning, which figures out 6:30 p.m., daylight saving time in New York on the day before, that is, on June 30. It may appear that the timing of the test has been rigged for the best possible radio audience and to make the morning newspapers, but by the time the bombing plane takes off in daylight for safety reasons, makes its three trial runs and final bombing run, 9:30 a.m. becomes the earliest practical hour. Later in the day the weather usually worsens from the point of view of cloud interference.

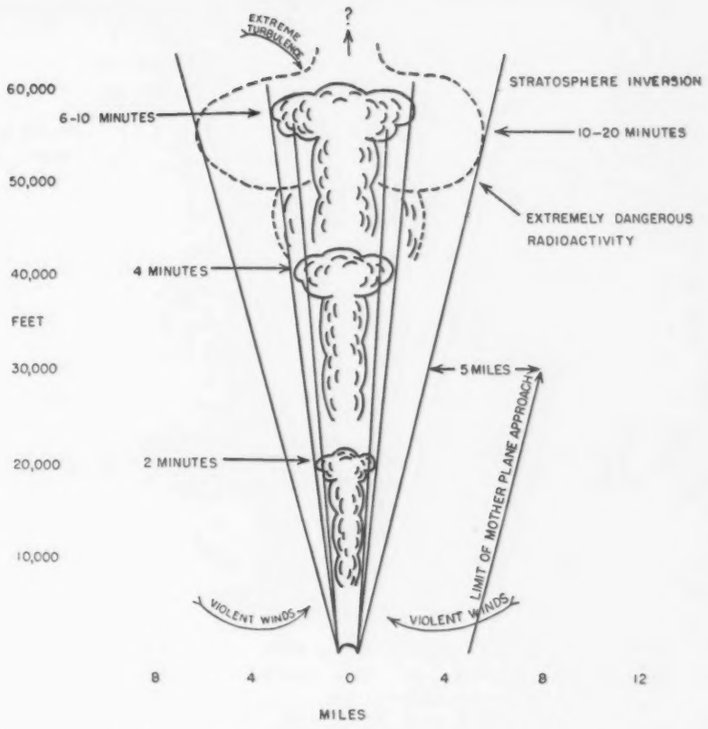
Of course it is highly unlikely that July 1 at Bikini will have appropriate weather for the test. Two weeks or more may elapse before the meteorologists give their OK, and until they do all the 100 or so operational ships and 140 airplanes, scattered from Bikini to Kwajalein will stay poised in position, and all personnel involved such as the 550 civilian scientists and technicians, 2750 Army flyers, 350 Army ground crewmen, 150 Marines, 38,200 Navy men and last and least the 100 or so newsmen will sit tight and swelter.

When the meteorological group comes up with a prediction satisfying to the high command, the actual die will have to be cast at approximately 10:00 a.m. on the day preceding Able Day, the day of the shot, because of the various wheels that must be set in motion before evacuating the target ships. The several men on each target ship and small group on the several islands of the Bikini group will be all day setting automatic instruments and checking all the other 10,000 different pieces of test equipment.

Some of these instruments are very simple, such as 5-gal gasoline cans which will be used to measure blast at various locations. Some of them are extremely complicated, such as tourmaline crystal gages for recording pressure, which are connected to radio sets and which will send their signals out by telemetering devices to locations outside the lethal area. There will be ball-crusher gages by which pressures exerted are measured by the deformation of a copper ball which is pressed by a piston. There will be measurements made by recording instruments which are self-contained, that is, instruments which are connected to rotating drums or rotating disks and will record a multiplicity of data as a function of time. Geiger counters in various locations will be set to send out a continuous record of radioactivity from many locations in the target area. And there will be a multitude of cameras, protected against heat and the fogging effect of radio-

activity, all to be set to record the waves that are formed, the motion of the ships, the shock wave and the compression wave which travel out from the blast, and cameras to picture the explosion itself from all angles. There will be such an overwhelming mass of data recorded that earnest effort for 5 yr or more will be required for their correlation into a complete picture to show all the finer permutations of the explosion.

By nightfall all these instruments will be set, and designated light craft will come in to evacuate the men, checking carefully each name on their lists so that no one will be left behind. At Kwajalein Atoll the B-29 will start loading the components of the atom bomb and by early morning will be ready to start off down a runway lined with water pumps located there as protection against that thousand-to-one chance that the bombing plane may crash on takeoff. At Eniwetok the B-17 Army control ships and the pilotless drones will be readied for takeoff to arrive in the target area before the bombing plane. And on the carrier Shangri-La, some 50 miles from Bikini, the Navy control planes and pilotless drones will be readied. These same control planes will handle the pilotless Navy drone speedboats that will be put into the water by a mother ship near Bikini.



PROBABLE position of the rising dust cloud at time intervals after the explosion. At various levels drone planes will be directed by mother ships into this cloud to obtain air samples.

All operational components will have moved into place by 9:30 the next morning when the bombing plane comes over for three trial runs to set and reset data on its bombsight. The fourth time over the bomb drops. Immediately after the explosion the drone aircraft will plunge into various sections of the radioactive cloud to collect dust samples, and the drone speedboats will be herded by radio into the lagoon for water and air samples. Six destroyers on the radioactivity safety patrol will start tracking the bomb cloud as it moves away from Bikini. Then the *Begor*, the mother ship for the drone boats will start in and will move along close to the reef trying to spot her boats and be of what help she can while they're being directed from the control aircraft. A destroyer will come down to join her, and after one of the drone boats has obtained its samples, it will be brought outside the lagoon, or at least right to the entrance, and the samples will then be transferred to the destroyer which will dash off like Paul Revere to Kwajalein to deliver the samples to the laboratory. A radiological safety boat will then slowly work its way inside the lagoon testing for safety with Geiger counters, and within several hours after the bomb drop the salvage ships should be at work inside the lagoon to prevent partially damaged target ships from sinking. Once the lagoon is declared radiologically safe the press ship will move in to start spouting to the world the what and why and when of the world's fourth atomic bomb at the ship's maximum capacity of 9000 words hourly.

A second article, "Bomb by Manhattan," will appear in a later issue of THE IRON AGE.

Swedish Acid Openhearth Steel

THE outstanding qualities of Swedish acid openhearth steel for special purposes, as compared with steels produced by the basic process, are reviewed by S. M. Wejle in an article entitled "The Swedish Acid Open-Hearth Process" published in *Metallurgia*, April, 1946. The physical properties, elasticity and fatigue resistance, are particularly significant—and are illustrated in applications such as ball bearings, steel in thin dimensions (cold-rolled and hardened strip steel for saws and springs, needles, safety razor blades, measuring tapes, thickness gages, etc.) These steels are normally supplied in the hardened and tempered condition and it is essential for the hardness and elasticity to be uniform as well as according to specifications.

These features are ascribed to the manner in which the acid openhearth process is carried out in Sweden. In the first place, Swedish pig iron is not the normal product of large coke blast furnaces using ordinary ores and giving high sulfur contents, but is melted in small furnaces using charcoal obtained from the coniferous forests, the purest metallurgical fuel known. Also, the blast furnaces are often heated electrically, while the ores used are of high quality, having extremely low phosphorus and sulfur contents. The scrap used consists entirely of discards from the company's own mills and consequently has high purity.

In addition to the special raw materials, the actual acid openhearth process is unique in that the furnaces used are small, the charge generally not running more than 20 tons, with the equipment designed to facilitate accurate control over the melting of the steel.

Extending The Jominy Scale

A simplified method for estimating the hardness of quenched and tempered steel from hardenability data is described in this article. Practical examples of the use of this method in selecting a steel for a copper brazed assembly are given.

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By JOHN ERB

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THE subject of hardenability is a much overworked and complicated one. Because of the wide variety of facts, theories, and opinions, which often cause as much confusion as they are of assistance, the following tables and charts were prepared to boil down the essentials into a form readily usable in everyday work.

Table I was computed from the more general tables of Russel[1] and gives the approximate half-temperature cooling times of round steel bars quenched in the common commercial agents. For convenience, the equivalent Jominy distances are also given.[2]

[1] *See also "How to Interpret Jominy Test Results,"* THE IRON AGE, *p. 64, Feb. 11, 1943.*

As an example of the use of table I, consider the Jominy curve for a steel such as shown by fig. 1, for which it is desired to know the hardness distribution in a 3 in. diam bar, when quenched in oil and tempered at 350°F. From table I the Jominy distances corresponding to a 3 in. diam, oil quench, is determined, as follows:

Location	Jominy Distance, in.	Equiv. Hardness Rc from fig. 1
Center	0.72	57
0.5	0.67	58
0.6	0.64	59
0.7	0.61	59½
0.8	0.57	60
0.9	0.54	61
Surface	0.51	61

The hardness values corresponding to the respective Jominy distances are taken from fig. 1, using the curve labeled 350°F, and set down in the third column in the table above. The plotted results are shown by the upper curves of fig. 2. The lower curve shows the hardness distribution in 4 in. diam, quenched in brine and tempered at 350°F. This was computed in a similar manner.

Useful as is the Jominy test, it is limited to comparatively small sections and liquid quenches, as shown by table I. However, a practical method of extending it to large sections has been devised.

In reality, the Jominy curve[1] is a cooling time-hardness, function. Therefore, in order to duplicate the cooling speeds of larger bars, it is only necessary to air-cool smaller sections and determine the corresponding hardness.

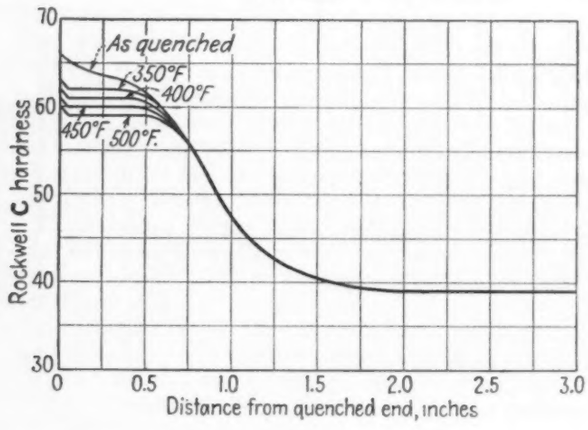
For example, it is seen from table I that the half-temperature cooling times of the following sizes, air-cooled, cover the range of oil or water-quenched bars up to 12 in. diam.

Diameter, Air-cooled	Half-Temp. Time Surface
0.75 in.	340 sec.
1.0 in.	475 sec.
1.5 in.	730 sec.
2.0 in.	970 sec.
2.5 in.	1200 sec.

All that is necessary, then, is to air-cool short lengths of the above (or other graduated sizes), determine the Rockwell hardness of the surface, and plot the same as an extension of the Jominy curve. Fig. 3 illustrates how such a curve might be constructed.

For still larger sections or slower cooling rates, it will be sufficient to "sandwich" the material to be

FIG. 1—Hardness values corresponding to respective Jominy distances.



tested between pieces of low carbon steel, in the manner shown in fig. 4. After hardening, the central disk is removed and tested. Like the Jominy specimen, the above test pieces may be tempered as desired.

One of the advantages of using the half-temperature cooling time, as compared to the cooling rate at 1300°F, is that the former takes transformation into consideration while the latter does not. Thus, predictions of hardness and structure can be made, using the half-temperature times superposed upon the S-curve for the steel in question. This method is particularly effective when used with the continuous cooling transformation diagram as developed by Liedholm and his associates.[5]

For instance, consider a case in which it is necessary to select a steel for a copper-brazed assembly. In one actual case of this sort, the cooling rate of the part was estimated as equivalent to a 1 in. diam. The use of 4130 steel was proposed, and the properties desired,

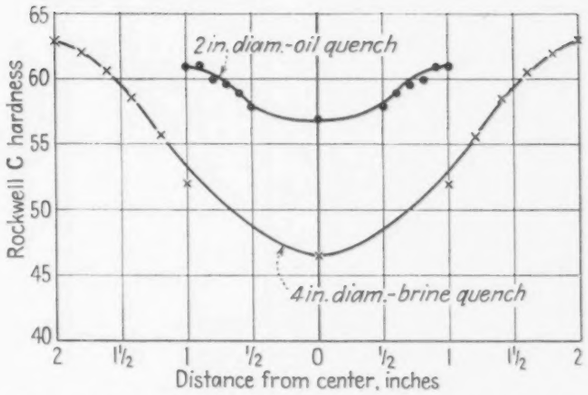


FIG. 2—Curves showing hardness distribution in quenched and tempered rounds in oil-hardening die steel, estimated from Jominy curves, fig. 1, by means of table I.

TABLE I

Approximate Cooling Times of Round Steel Bars in Three Common Quenching Agents With Equivalent Distances on the Jominy Bar

Diameter (Inches)	Jominy Distance In. Volume / Surface	HALF TEMPERATURE TIME (Seconds) AND JOMINY DISTANCE (Inches)																
		BRINE OR WATER-JET QUENCH							OIL QUENCH							AIR	
		Centre	.5r	.6r	.7r	.8r	.9r	Surface	Centre	.5r	.6r	.7r	.8r	.9r	Surface	Centre	Surface
⅛	0.031	.00 1.3						.00 .10	.01 3.6						.01 3.4	.54 52	.54 52
¼	.063	.00 2.9						.00 .10	.08 7.4						.07 7.1	1.02 117	1.02 117
⅜	.094	.02 4.4						.00 .10	.12 11.2						.11 9.8	1.44 172	1.44 172
½	.125	.05 5.9	.04 5.5	.04 5.3	.04 5.0	.04 4.8	.03 4.5	.00 .10	.19 15						.16 12.5	1.96 222	1.96 222
⅝	.156	.08 8.2	.08 7.6	.07 7.2	.07 6.8	.06 6.4	.06 6.0	.00 .10	.25 20						.21 17	300	300
¾	.1875	.12 10	.10 9.3	.10 8.8	.09 8.1	.08 7.6	.07 7.0	.00 .10	.29 24						.25 20	350	350
⅞	.219	.15 12	.14 11	.12 10	.11 9.7	.10 8.7	.08 8.0	.00 .10	.35 29						.28 23	420	420
1	.25	.19 15	.16 13	.16 13	.15 12	.12 10	.10 9.3	.00 .10	.40 34						.32 26	475	475
1¼	.31	.26 21	.22 18	.20 16	.19 15	.16 13	.15 12	.00 .10	.47 43	.46 41	.44 39	.42 37	.41 36	.40 34	.38 32	605	605
1½	.375	.32 26	.27 22	.26 21	.25 20	.20 16	.16 13	.00 .10	.54 53	.51 49	.50 47	.48 45	.47 43	.45 40	.44 38	730	730
1¾	.44	.39 33	.34 28	.32 26	.30 24	.25 20	.20 16	.00 .10	.64 65	.59 59	.57 57	.55 54	.50 50	.49 46	.46 44	850	850
2	.50	.45 40	.39 33	.37 31	.34 28	.28 23	.22 18	.00 .11	.72 76	.67 70	.64 66	.61 62	.57 57	.54 53	.51 48	970	970
2½	.625	.57 56	.48 45	.46 42	.42 37	.36 .30	.27 22	.00 .13	.91 102	.82 90	.79 86	.75 81	.69 73	.65 67	.58 58	1250	1200
3	.75	.71 77	.60 61	.55 54	.50 47	.42 37	.30 25	.00 .14	1.14 133	1.00 115	1.07 110	.91 102	.82 90	.75 81	.60 61	1530	1440
3½	.875	.88 98	.72 77	.66 69	.58 58	.48 44	.35 29	.00 .15	1.36 162	1.22 144	1.15 135	1.07 123	.95 107	.86 95	.68 69	1775	1680
4	1.00	1.05 120	.86 96	.77 84	.66 68	.54 52	.38 32	.00 .17	1.67 196	1.38 164	1.32 156	1.22 144	1.05 120	.92 104	.68 72	2080	1960
5	1.25	1.47 175	1.17 137	1.04 119	.85 94	.66 69	.46 41	.00 .20	2.55 270	2.00 225	1.77 206	1.64 194	1.36 162	1.12 131	.78 85	2560	2440
6	1.50	2.24 242	1.60 189	1.33 158	1.06 122	.78 85	.51 48	.00 26	350	296	270	243	198	153	99	3150	2880
7	1.75	320	240	202	153	103	56	.35	440	368	331	294	240	172	105	3680	3310
8	2.00	400	304	248	192	125	66	.42	544	448	400	352	272	192	115	4320	3840
9	2.25	505	372	303	232	148	75	.50	667	535	475	415	324	222	127	4850	4240
10	2.50	612	450	362	275	173	88	.60	800	625	563	475	375	240	138	5500	4750
12	3.00	865	612	497	375	226	108	.70	1080	834	738	594	450	270	151	6850	5760

Top figures are jominy distances and bottom are half-temperature times.

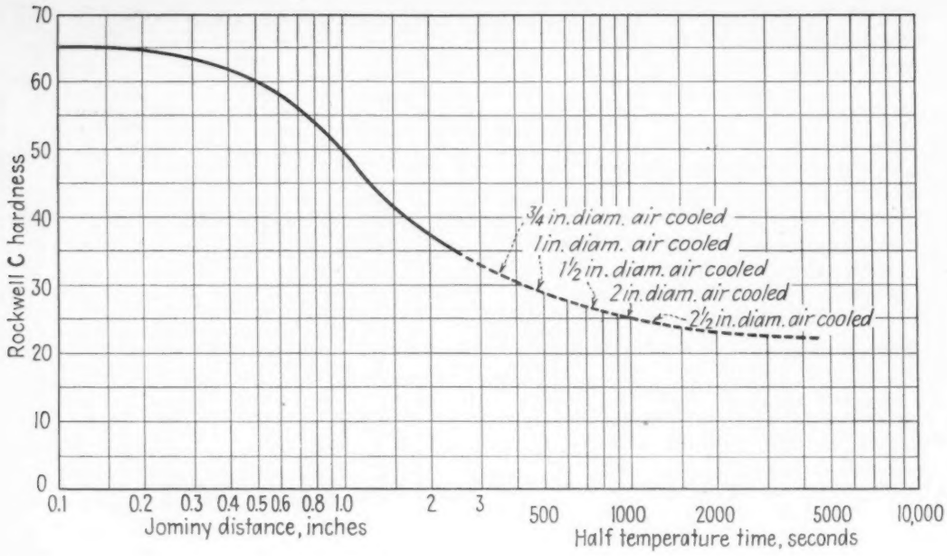


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FIG. 3 — Rockwell hardness of surface plotted as an extension of the Jominy curve. Curve shown is hardness and cooling time for 8750 steel.

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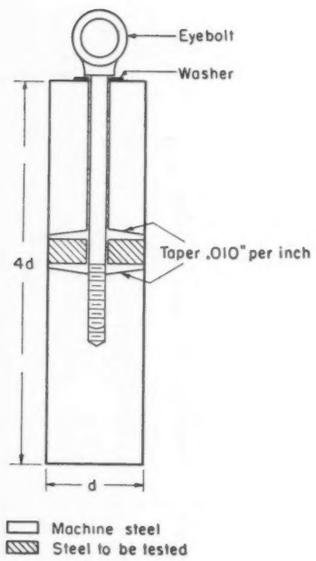

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FIG. 4 — Sandwich of material to be tested between pieces of low-carbon steel.

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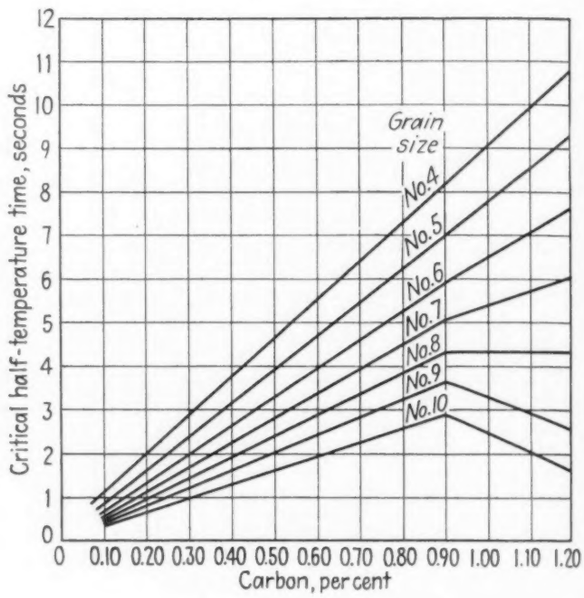
FIG. 5 — Relation of carbon content and grain size to hardenability. Half-temperature time computed from Grossman's Ideal Critical Diameter by means of the equation $D^2_1 = Kt$, where D_1 is the ideal critical diameter, t = half-temperature time, and K = constant = 0.2.



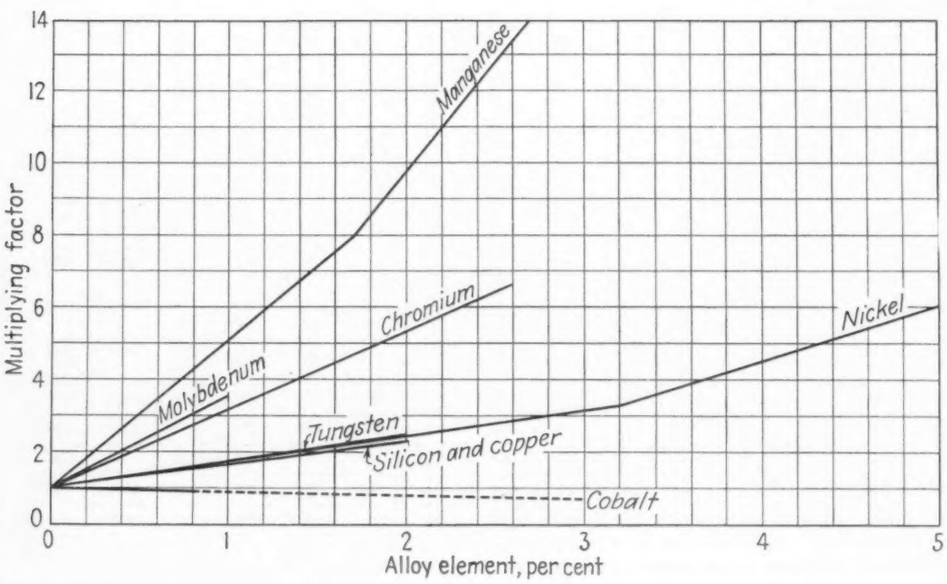


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FIG. 6 — Effect of alloys on hardenability

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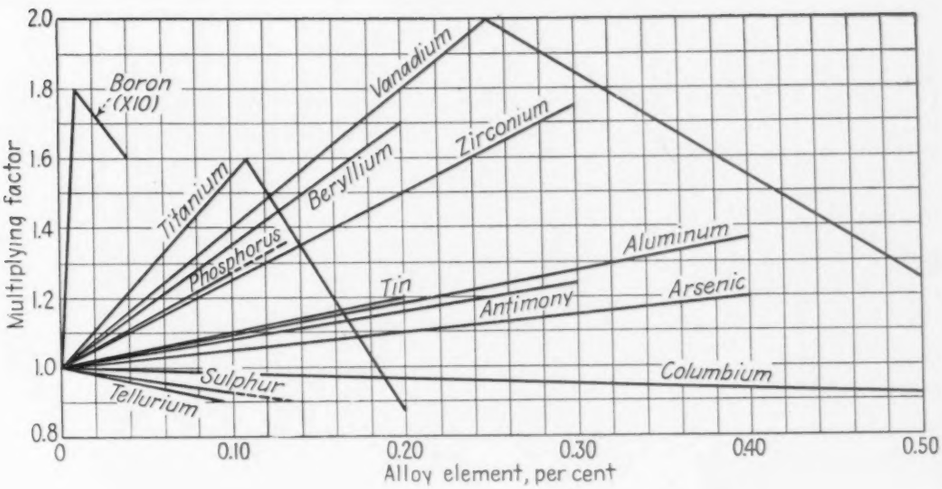


FIG. 7 — Effect of the trace elements on the hardenability of steel.

after brazing, were approximately 250 to 300 Bhn, 25 to 30 Rc.

The engineers associated with the development proposed to quench the assembly at some time after brazing, in order to develop the desired hardness. After study of the factors involved, it was felt that quenching would introduce several undesirable elements, including higher cost, warpage, and even failure of the brazed joints.

An analysis was therefore made as follows:

(1) The half-temperature cooling time of a 1 in. diam rod, air-cooled, is, from table I, about 475 sec.

(2) From the diagram by Liedholm (Metal Progress Data Sheet—Nov. 1944) on X4130 steel it will be seen that: Using 800°F as the half-temperature, and 475 sec as the time, a final hardness of between Rc 29 and 44 might reasonably be expected.

(3) Due to the grain coarsening effect of the very high brazing temperature, a still higher hardness would (based upon our experience) result.

(4) Therefore, it would be more than sufficient to cool the steel in the chamber usually provided in such brazing furnaces, without any quenching at all with its attendant expense and disadvantage.

(5) In fact, after study of Liedholm's diagram for 8630 steel (Metal Progress Data Sheet, Sept. 1944) it was evident, in the light of experience, that this steel, naturally cooled, would provide ample hardness and, at the same time, better brazing characteristics due to the lower chrome content.

An alternative analysis was made as follows: From published curves, the Jominy distance of 8630 to 25 Rc is about 0.75 in. This corresponds (see table I) to a half-temperature time of 81 sec. However, the 8630 of the Jominy curve was fine-grained, approximately No. 7. The brazing temperature (2150°F) would certainly coarsen the grain to No. 3 or larger.

Now, from fig. 5, the "critical" half-temperature time for 0.30 C is 1.7 sec for No. 7 grain, and may be estimated as 3.4 for No. 3. Since the half-temperature to 25 Rc was determined by Jominy test as 81 sec for No. 7 grain, it seems only reasonable to suppose that the grain coarsening by brazing would raise the hardenability by about th same proportion, namely

$$\frac{3.4}{1.7} \times 81, \text{ or } 162 \text{ sec.}$$

This is far short of the 475 sec estimated as necessary of the original assumption. Consequently, this analysis would indicate the use of a steel of somewhat higher carbon, such as 8635 or 8735.

The discrepancy in the analyses, whether based upon Liedholm's diagrams, or upon Jominy and grain-size effects, may be resolved by further developments. What is needed is an extension of the present data by means of the methods proposed in the early portion of this article.

Figs. 6 and 7 have proven of considerable assistance in estimating hardenability by methods similar to those used by Grossman, but employing half-temperature times in preference to "ideal critical diameters."

For example, see fig. 1. From that illustration, corresponding to carbon 0.88 and grain size No. 9½, the critical half-temperature time is shown to be 3.25. Figs. 6 and 7 give the multiplying factors corresponding to the various elements. Tabulated, they are:

Oil Hardening Tool Steel

Grain Size (by fracture) = No. 9½

Analysis	C	Mn	Si	Cr	W
	0.88	0.61	0.34	1.42	0.36

Calculated Critical
HTT* 3.25 x 3.5 x 1.25 x 4.1 x 1.4 = 82 sec

Actual Critical
HTT* (from Jominy Curve Rc = 54) = 84 sec

* = Half-temperature time

Under any circumstances, considering the ease with which experimental heats of steel can now be made and the hardenability determined by Jominy or equivalent test, it would seem unwise to place too great dependence upon calculation alone, except to estimate the effect of projected new compositions.

References

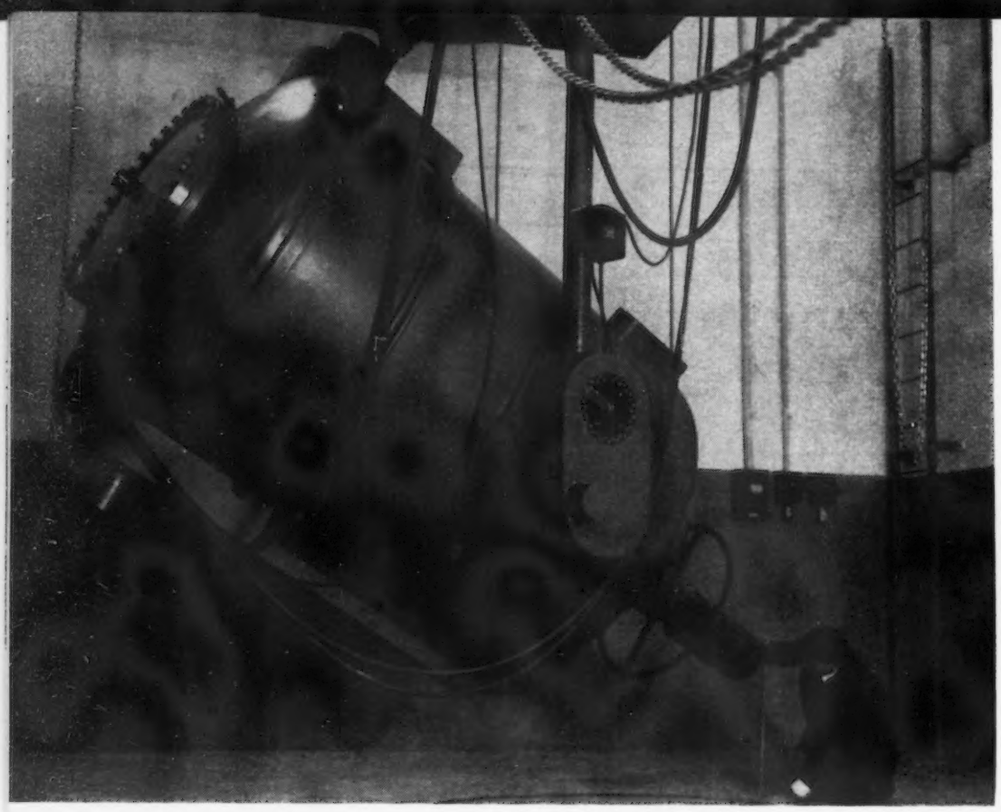
[1] T. F. Russell—"First Report Alloy Steel Research Committee," Iron and Steel Special Report No. 14, 1936, p. 149.

[2] Asimow, Craig and Grossman—"Correlation Between Jominy Test and Quenched Round Bars," SAE Journal, 1941, p. 283.

[3] C. A. Liedholm—"Continuous Cooling Transformation Diagram," Metal Progress, Jan., June, Sept., Nov., 1944.

[4] M. A. Grossman—"Hardenability Calculated from Chemical Composition," AIME Trans., June, 1942.

[5] T. G. Digges—"Effect of Carbon on the Hardenability of Pure Iron-Carbon Alloys," ASM Trans., 1938, p. 408.



Two-Million

TWO-MILLION volt X-ray unit installed at the Midvale plant, the first industrial unit of this type installed in the U. S.

DEVELOPMENT of the ultra-high voltage X-ray generator has greatly extended the field of nondestructive testing. One-million-volt X-ray generators, once the exclusive possession of hospitals and physics research laboratories, are now widely distributed in industrial plants. The Midvale Co. was the first manufacturing company in the United States to purchase and install a 2-million volt industrial X-ray unit. Originally intended for the production inspection of forgings for jet propulsion, this unit will now be used in a more extensive manner to control the quality of castings and forgings and to aid in developmental work.

This 2-million volt unit provides the ideal nondestructive testing method for the following purposes and types of work:

(1)—Castings of steel and other high density metals of complicated shape and of great variation in section thickness from ¼ to 12 in., particularly those of large section thickness, also high pressure and temperature applications for alloy steel and nonferrous castings and pilot castings for foundry control and ingot mold design problems.

(2)—Forgings of steel and other high density metals containing highly stressed areas in inaccessible locations which are difficult to manufacture and whose failure in service would be costly and of serious consequence. It is sometimes desirable before further machining to determine whether or not what are apparently surface cracks extend to a significant depth in an expensive forging. The radiographic inspection of highly stressed alloy forgings of such design that routine inspection does not disclose serious internal defects is definitely indicated. Gas turbine forgings are illustrative of this where the failure of some small, relatively unimportant part may lead to extensive damage.

(3)—Weldment inspection of all types, particularly those for high temperature and pressure vessels of wall thickness in excess of 5 in.

(4)—Billets, blooms and bars of steel, and other high density alloys, of thicknesses up to 12 in. where a high degree of homogeneity is desired or where a knowledge of the condition at an intermediate stage of the manufacturing process is valuable from a development or control standpoint.

(5)—Reduction of machining costs by revealing defective areas that subsequent machining would uncover. In many cases chipping and welding in the indicated areas will give a satisfactory product.

(6)—Minimizing the necessity for over-designing by using material of a definitely known soundness.

It is not to be inferred that the primary purpose of radiography is the selection of the defective from the acceptable in the case of castings, forgings and weldments. It also performs the positive function of indicating how to apply a repair process to salvage the defective parts. Heavy castings containing mild shrinkage areas may be scrapped if subsequent machining runs into them. Thus radiography can minimize useless machining costs. The list of applications cited is by no means complete but is intended to indicate the salient types of work adapted to radiography by the 2-million volt X-ray unit. Time will undoubtedly multiply the list.

In a true historical sense the advance in boiler drum construction was linked directly to the evolution of the art of nondestructive testing. The mechanical limitations and the undesirable stress characteristics of the riveted joint restricted its use to drums of 2½ in. max wall thickness.

Forge welding when used was restricted to certain types of vessels, being limited to a maximum wall thickness of 2 in. and to use of low carbon steel. Hence the maximum working pressure of such drums was doubly limited. In attempting to meet the more severe requirements of advanced power plant design and industrial processes, recourse was had to the

Other articles on high-voltage radiography previously published in THE IRON AGE *include: "High-Voltage Radiography," Feb. 21, 1946, p 58; "Two-Million Volt X-ray Tube," Nov. 2, 1944, p 62; Report of National Electronics Conference, Oct. 19, 1944, p 118.*

Volt Industrial Radiography

By L. CARDENAS
Radiographer, Midvale Co., Philadelphia

The first 2-million volt X-ray unit to be installed in an industrial plant in the U. S. is described in this article. Types of materials and structures particularly suitable for inspection by a machine of this high power are listed and such high voltage X-ray generators as the low frequency resonance transformer, the Van de Graaff generator and the betatron are discussed.

forged seamless drum. This type of drum offered the advantage of freedom from any kind of joint. However, design of such vessels may be restricted by the limitations of the forging technique and equipment. The development of existing fusion welding processes to the degree that they would meet rigid specifications has extended the possibilities of design and application. Inasmuch as the quality of pressure vessel weldments and the efficiency of the welding technique were to a high degree indeterminate, the development of a nondestructive test method to supplement the otherwise inadequate physical tests on weld test specimens was necessary. Such a test permitted examination of the weld itself for the presence of such defects as excessive porosity, entrapped slag, non-fusion, and cracks. The Bureau of Engineering of the Navy and the ASME code now require that main fusion welded joints be radiographed.

The advent of the 2-million volt X-ray tube has made rapid and highly efficient examination of pressure vessel welds of all types and thicknesses a simple, economical matter. This is exemplified historically by the fact that in 1941 X-ray examination of 12 in. weld 5¼ in. thick required 7½ hr with the best existing technique. Today the 2-million volt X-ray tube could examine 40 in. or more of weld by this thickness in a matter of a few minutes and incidentally produce a more satisfactory radiograph.

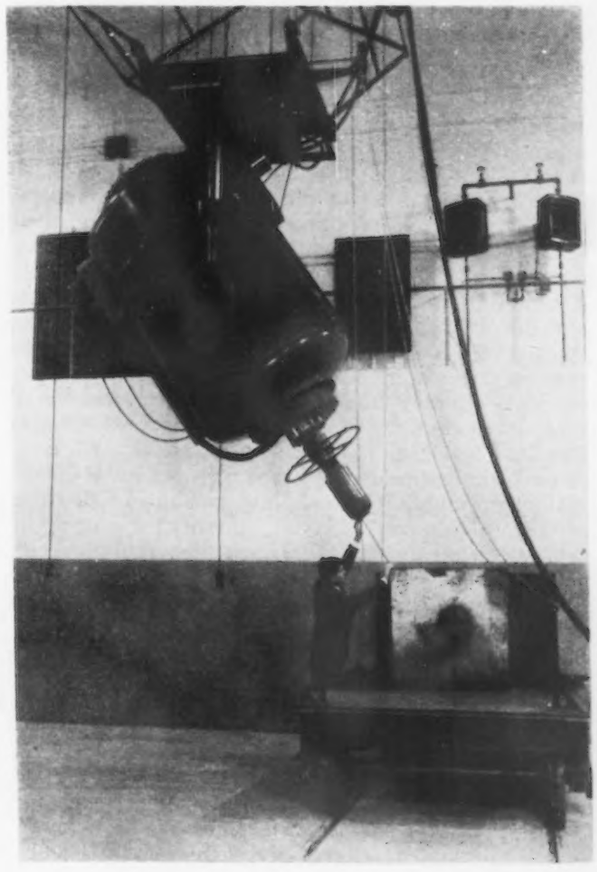
The radiographic examination of castings designed for critical applications is expanding due largely to the extension of high strength steel castings into the field formerly exclusively the domain of forgings.

In a steel plant engaged in a large volume of foundry work, the primary function of radiography would be the control and development of proper foundry technique. Generally the design engineer includes a factor of safety sufficient to provide for any lesser defects resulting from conditions beyond the control of average economical foundry procedure. The substitution of castings for forgings, due to the limitations of available forging equipment or the use of nonforgeable materials, requires in some instances the redesigning of the parts. This new design may be made on the basis of supplying a casting whose known strength is equal to that of the equivalent forging. In these instances, and where the additional restriction of minimum weight specifications are to be met, involving use of the part in highly stressed region, 100 pct radiographic inspection is requisite. However, the greatest number of castings are neither so critically designed nor for intended use under such exacting conditions. For these, a type of X-ray inspection depending on the design load to material strength ratio, providing this is determinable, is indicated. It may be said that the proper mode of X-ray inspection should derive from the conditions peculiar to any given setup, and should be based finally on the actual hydrostatic or mechanical breakdown tests of the parts themselves.

The three types of ultra-high voltage X-ray generators now in use are the low frequency resonance transformer, the Van de Graaff electrostatic generator, and the induction accelerator or the betatron.

The first type of generator consists of a low frequency coreless resonant transformer within which a sealed off multisection X-ray tube is coaxially affixed.

FIG. 1—Setting up the 2-million volt x-ray machine to examine a large forging.



In the unit installed at Midvale, fig. 1, by the General Electric Co., the transformer and tube are mounted on a hermetically sealed cylindrical steel tank 5 ft in diam and 8 ft in length. Insulation against spark-over is provided by the use of Freon-12 (di-chlor-di-fluor-methane) a dielectric possessing three times the insulating power of oil and weighing 1/120th as much. A metal extension chamber projecting 3 ft from the tank constitutes the lower end of the X-ray tube. The electrons emitted by the filament at the upper end of the tube are driven by the successive application of high voltage electromagnetic fields to attain a velocity

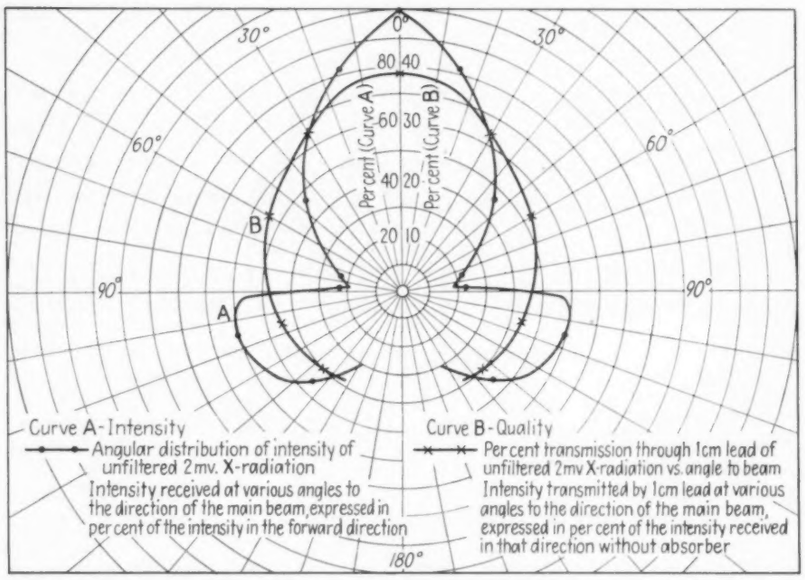

0°
30°
30°
60°
60°
90°
90°
180°
80 40
60 30
40 20
20 10
Percent (Curve A)
Percent (Curve B)
A
B
Curve A - Intensity
Angular distribution of intensity of unfiltered 2 mv. X-radiation
Intensity received at various angles to the direction of the main beam, expressed in per cent of the intensity in the forward direction
Curve B - Quality
Per cent transmission through 1cm lead of unfiltered 2mv X-radiation vs. angle to beam
Intensity transmitted by 1cm lead at various angles to the direction of the main beam, expressed in per cent of the intensity received in that direction without absorber

FIG. 2—Polar plot of intensity and quality distribution of the 2-million volt X radiation. Source: General-Electric X-Ray Corp.

96 pct the velocity of light, bombarding the tungsten target at the end of the extension chamber and causing it to radiate X-rays. The unit at Midvale is extremely flexible, being capable of rotation in the horizontal and vertical plane and of being traversed in three directions by means of a bridge crane, hoist and cross-travel carriage. A very desirable feature of the unit is that its power consumption is exceedingly low, the high tension transformer being energized by a 10 kw single-phase 180 cycle alternator driven by a 20 hp synchronous motor. The entire system is operated at unity power factor. When it is recalled that the 1-million volt X-ray tube is credited with a reduction of the time factor in radiography by a factor of 10 to several hundred relative to that required by 400,000 v equipment; and that the 2-million volt unit is 100 times as fast as the 1-million volt in radiographing 8 in. thick sections, an idea of its very high radiation output is gained.

The Van de Graaff electrostatic generator involves a modernization of the old Wimshurst "influence" machine. As used by the Navy during the war, it consisted of a vertically mounted steel tank containing the X-ray tube, a motor driven belt of some insulating material, a device for spraying corona onto the belt at relatively low voltage, and compressed dry air for insulation. The electrostatic charges carried by the belt are removed by a brush at the upper end and transferred to the surface of a conductive hemisphere. This hemisphere is electrically connected to the filament of the X-ray tube so that a 2-million volt constant potential is impressed across the tube. The target is simply a slug of gold which becomes molten under electron bombardment, and surface tension is relied upon to maintain a focal spot of constant size. This type of unit proved useful in the examination of captured enemy equipment, particularly that of an explosive character requiring disassembly, shells loaded with TNT to determine whether undesirable cavitation of the TNT existed, and the radiographic inspection of armor plate.

The induction accelerator, commonly known as the betatron, is in a true sense a radical departure from the conventional method of X-ray production. This accelerator consists of an evacuated toroidal shaped envelope into which electrons are injected in cyclic pulses and are accelerated by the application of a relatively low voltage to velocities at which they possess energies ranging up to 100,000,000 electron volts. By deflecting these whirling high energy electrons against a target, both electrons and X-rays are emitted. The betatron is primarily a tool of the research nuclear physicist. It is to be expected that it will, in the near future, be increasingly adapted to the needs of industrial radiography. During the war the Navy used it for military applications of a secret nature. One property of the betatron which makes it highly desirable for the radiography of thick sections is what is termed its "absolute sensitivity." This means that its ability to detect defects of a certain limiting size is largely independent of the section thickness in which the defects occur.

The electrical design of all three ultra-high voltage X-ray generators is such that from the viewpoint of power consumption they are economical. The resonance transformer X-ray generator is definitely the most versatile in the present development state of the units since is is the only one that is truly mobile. The Van de Graaff generators were mounted in fixed emplacements requiring that in setting up for radiography the work be manipulated under the target. This was a consequence of the fact that the X-ray tube was not sealed but was connected to a system of vacuum pumps. Future design will in all probability overcome this drawback. The 20-million volt betatron in some cases has been provided with trunnions giving it a limited rotation about a horizontal axis, but it is manifestly a difficult problem to render mobile the 100-million volt betatron which weighs 125 tons.

The quality of the radiation, that is, its spectral composition, is such that the 20-million electron volt betatron has been able, using special Eastman intensifying screens, to penetrate a 20 in. thick metal plate. The Van de Graaff and the resonance transformer generator are both capable of examining 12 in. thick sections, and, under certain conditions, could probably economically extend their range a few inches more. An attempt is now being made to demonstrate this using Eastman H screens. The superiority of the resonance transformer generator over the other two

types is manifest in considering the relative efficiency of X-ray production. The betatron emits a very intense but narrow beam so that its area coverage is small. Unless blocking of the central portion of the beam is resorted to, a radiograph of nonuniform density is produced due to the intense central radiation. This is a severe economic limitation. The Van de Graaff generator radiates a conical beam of X-rays which subtends a fairly large angle and hence is an improvement over the betatron in this respect. The resonant transformer unit's radiation output is really tremendous, being over 300 r per minute at 100 cm distance from the focus. Further, its radiation is emitted in a spherical pattern. The intensity and spectral composition of the radiation vary with the angle from the central or direct beam, as is illustrated in fig. 2. This feature can be advantageously exploited in special cases. For example, this unit is the only one capable of radiographing an entire circumferential weld in one exposure by its reflected beam. The betatron is in reality a less efficient generator of X-rays than this unit; and, despite its greater penetrative powers, not nearly as practicable.

The introduction of the 1-million volt industrial X-ray unit was hailed as the largest single development in the field. Its superiority over the 400,000 v equipment then in use derived from the fact that not only was its radiation more penetrative, but also, since most of the scattered radiation was in the forward direction, it produced a radiograph possessing higher definition. Relative to the 1-million volt unit, the 2-million volt possesses the same advantages, being able to radiograph 8 in. of steel in 1/100th of the time required by the former. This ratio becomes even more favorable at higher section thicknesses. Another very definite advantage of the 2-million volt unit is its ability to achieve a high radiographic sensitivity over the thickness range ¼ to 12 in. This makes possible the radiography of a number of different metal thicknesses in a single exposure, eliminating time consuming blocking. The possibility of simultaneously inspecting a large number of objects of different structure and composition is a useful feature of the 2-million volt X-ray unit.

Lift Truck Adapted to Charging Box Furnaces

USE of an industrial lift truck for pushing large and heavy carburizing boxes into the chamber of a box furnace is suggested by Lindberg Engineering Co., Chicago, as a means of saving time and effort in charging heavy boxes. The accompanying illustrations show the equipment required to adapt a lift truck for such work.

Fig. 1 illustrates the construction of the push rod. This consists of a long iron pipe with a cradle welded on one end. A simple alteration of the lift truck makes it possible to attach this pushing cradle to the loading platform. With this done, it can be lowered or raised to the furnace receiving platform for pushing the carburizing box into the work chamber.

To alter the lift truck platform to take the pushing cradle, a circular hole is cut in the front edge of the platform, as shown in fig. 2. The shaft is slipped through the hole—under the platform proper, and comes to rest on a pilot at the rear of the platform at *A*.

Sometimes the floor area in front of the furnace is limited, and this in turn limits the maximum length of the pushing cradle. If required, the length of the shaft can be made adjustable by means of a telescoping arrangement shown in fig. 1 with provisions for locking the shaft with a key at various different lengths.

A convenient arrangement for unloading a furnace is shown in fig. 3. Two heat theaters—one handling each poker, put the chain and rods into the work chamber, above the carburizing box, and lower it so that a poker is on each side, and the chain behind the box. The two rings on the handle end of the pokers fit over a hook on the lift truck. By backing the truck a few feet, the charge is easily pulled from the work chamber.

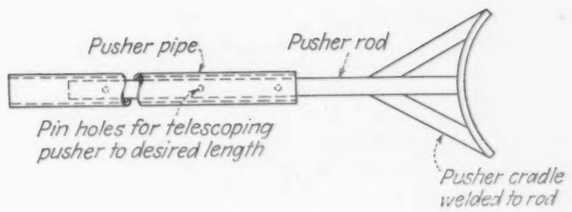


FIGURE 1

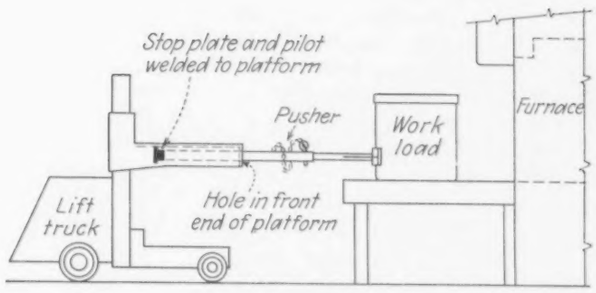


FIGURE 2

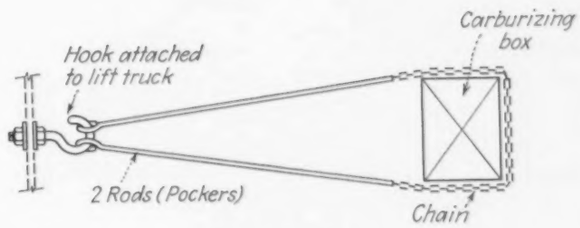


FIGURE 3

Practical Tool Room Heat Treatment

By F. J. McMULKIN
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THE presence of decarburization on the surface or cutting edges of certain tools is particularly objectionable, especially when a tool has been finish ground before heat treatment. Decarburization, as is well known, is simply the removal of carbon by oxidation, from the surface of the steel section being treated, with the result that the surfaces so affected are not able to develop their full hardness during heat treatment. Early failure of cutting edges and wearing surfaces which have been decarburized may be expected, and therefore it is important that decarburization be eliminated where grinding of the tool is not allowed for after heat treatment.

This is the second part of a four-part article. In the first part, published June 6, the author reviewed the classifications of tool steels and introduced the principles of heat treatment. In a subsequent issue the author will discuss the quenching and tempering practices.

Causes of Decarburization

Decarburization may be caused by the presence of a number of different elements in the heat treating furnace. Oxygen which may be present in the furnace as air will cause decarburization at nearly all temperatures above 1300°F. Water vapor in the furnace is also a violent decarburizer, especially on the higher chrome type steels, this decarburization action taking place mainly between the temperatures of 1300 and 1900°F. Carbon dioxide will also act as a decarburizer when present in the higher percentages. Furnace atmospheres and the effect of the different decarburizing agents will be discussed in the section dealing with "Furnace Atmospheres."

As mentioned previously, decarburization and scaling do not take place to a deleterious degree until 1300°F has been passed. It is, therefore, evident that one need not worry about steel decarburizing below this temperature. It is very important, however, that due precautions be taken when this temperature is passed or, in other words, when annealing, hardening, or like treatments are being carried out.

Prevention of Decarburization

There are a number of methods by which decarburization of the work may be prevented when heating above 1300°F. The principle ones may include the following: (1) Heating in a controlled-atmosphere muffle furnace; (2) packing in a medium containing carbon; (3) heating in a neutral or carburizing salt bath; (4) heating in a carbon muffle block; (5) treating the surface of the work with a protective coating, and (6) burning of a carbonaceous material in the furnace muffle.

The first method of preventing decarburization, that of using a controlled atmosphere in the furnace, is probably the most desirable. If good atmosphere control can be obtained and maintained during heat treatment, then the disadvantages met with in the other methods can be eliminated. Unfortunately, however, the amount of equipment necessary to furnish the perfect atmosphere is generally too extensive and expensive to merit its use in connection with small furnaces doing only intermittent work. It is possible during short heat-treating cycles to maintain comparatively close control of a furnace atmosphere by burning gas in a muffle type furnace. Unfortunately, however, when it is necessary to heat a tool for an extended period of time, some decarburization is bound to take place, since perfect furnace atmospheres, as pointed out above, are not obtainable without elaborate equipment. More will be said concerning this in the section dealing with "Furnace Atmospheres."

The second method of preventing decarburization is that of packing the work to be treated in a medium containing carbon. One of the best of these media is a pack of cast iron chips. Since cast iron chips are particularly high in carbon, they serve to remove free oxygen from the vicinity of the steel being heated. There is one disadvantage in the use of cast iron chips, and that is the unfortunate facility they possess of adhering to the surface of the work being treated. This can be avoided by wrapping the tool in common brown wrapping paper which is sufficient to separate the surface of the steel from the surrounding chips. It is recommended that new cast iron chips, before they are employed for packing, should first be "spent" by heating to a temperature approximately 50°F higher than that at which they are to be used. Packing should be carried out in a steel container which is equipped with a close fitting lid—one which can easily be sealed with some type of refractory cement. The general practice is to surround the work with cast iron chips to a depth of approximately 1½ in. A pack made up of medium sized chips of silicon carbide will also give results comparable to those achieved with cast iron chips. The silicon carbide will be found to be more stable

Six means by which the practical heat treater can avoid decarburization of tool steels during heat treatment, with particular emphasis placed on the use of proper furnace atmospheres in obtaining desired surfaces is discussed in this article. The author also raises the question of the effect of various atmospheres on the physical properties of the steel.

than cast iron chips but the initial cost will be higher.

This packing technique is particularly useful in annealing or, in other words, softening parts which have been previously hardened, since it insures a slow rate of heating and cooling, and makes it possible to maintain the work at temperatures of 1500° to 1700°F for periods up to 5 hr without any danger of decarburization.

Packing the work in a 50 pct mixture of charcoal and spent charcoal is another method sometimes used. Packing is carried out in much the same way as described above when cast iron chips are used. Unfortunately, this method is rather tricky, since below 1600°F there is actually a slight decarburization action due to the formation of carbon dioxide. In a temperature range of 1600° to 1750°F the mixture is comparatively neutral as long as the box used for packing is adequately sealed. At higher temperatures, however, there is the possibility that a carburizing action may take place due to the formation of carbon monoxide. This method is not particularly recommended, although good work has been turned out in many cases when it has been employed.

The third method of preventing decarburization is that of heating in a neutral or slightly carburizing salt bath. As long as the heating cycle or time at temperature is not too long, this method is quite practical and is particularly adaptable in the case of small parts where this method is used for heating to the hardening temperature followed by an oil or water quench. Due care must be taken that preheating is practiced with certain types of steel and certain sizes and shapes to avoid the possible occurrence of cracking which may be caused by the quick heating rate encountered when heating work in molten salt baths.

It is also important, when so-called "neutral" salt baths are used, that care be taken to rectify these baths periodically and in this way remove the decomposition products of the bath which are mainly oxidizing in nature.

The use of carburizing salt baths for protection of work from decarburization is also practiced with success when the time at temperature is not more than 10 or 15 min. This method is particularly adaptable to the heating of the higher carbon tool steels which will not absorb or take on an appreciable amount of carbon due to their high initial carbon content. It is, in fact, sometimes advantageous to have a slightly higher carbon content on the surface of certain types of punches and dies.

The fourth method is that of heating the work in a muffle made in the form of a carbon block. The carbon tends to eliminate the presence of all oxygen which might attack the steel. It is possible to obtain an atmosphere in the block running 30 pct carbon monoxide. This method is very satisfactory for heating "high-speed" steel tools but its use is limited for the most part to the smaller sizes of tools. The carbon muffle blocks may either be purchased or made up from carbon slabs. The block should be used in conjunction with a silica carbide or similar refractory muffle into which it just fits. This prevents burning away of the outside surface of the block and protects the block. This method is widely used and makes possible the hardening of decarburization-free and scale-free work.

The fifth method of preventing surface decarburization is that of using a protective coating on the surface of the parts being treated. There are two satisfactory methods of applying such a surface coating. The first is by the use of paint which is essentially composed of copper and a ceramic material. This is applied to the surfaces to be protected in the same way as a paint would be. It is essential that the surface being thus coated shall be free from any oil or greasy material and a degreasing operation is generally required. In most cases this protective coating of copper must be removed after heat treating, and this is accomplished by means of shot blasting, steel brushing, or by treating the part in boiling water followed by a light pickle in warm muriatic acid.

Another method of applying a protective coating is by treating the surfaces with borax. When the borax method is used, the tool is first preheated to a dull red heat, sprinkled with borax powder or

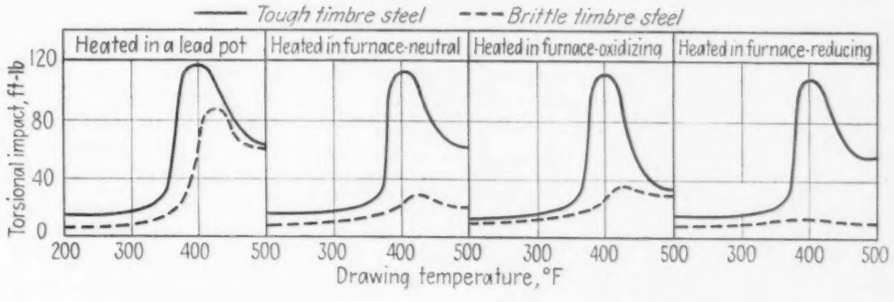

FIG. 3—Effect of different hardening furnace atmospheres on toughness of carbon tool steel hardened at 1550°F (Carpenter Steel Co.).

rolled in a box of borax, and then returned to the furnace for further heating. The borax melts, covering the tool with a thin protective film which remains while the tool is being brought up to the hardening temperature. A very small amount of borax is all that is necessary and heavy films are to be avoided as thick glassy deposits are hard to remove, and the tools must be cleaned later by sand blasting or by pickling in acetic acid. For this reason the following method of using borax is often preferred: First prepare a saturated water solution of the borax and after the tool has been warmed up in the furnace, dip it in the hot borax solution, then quickly remove it. The tool dries from its own heat, leaving on it a small incrustation of borax which melts to a thin, scarcely perceptible film when heating is continued.

The sixth method of combatting decarburization is one in which some material such as charcoal or a carburizing compound is placed in the muffle with the work. The charcoal or other agent which is used is one which has an affinity for oxygen and tends to remove most of the free oxygen from the air of the muffle. This method is, of course, only adaptable for use in gas, oil-fired and electric muffle type furnaces and will only afford partial protection.

Furnace Atmospheres

In heat treating, the effect of furnace atmospheres on steel, and in particular tool steel, is an important consideration for two reasons. First of all, the type of furnace atmosphere used determines the surface condition of the work after heat treating. In the case of milling cutters and similar tools on which other than superficial grinding is generally not allowed after heat treatment, it is necessary that no decarburization of the cutting edges take place. It is important in some cases that scaling be avoided and this, like decarburization, is an undesirable surface condition which may be encountered if the wrong furnace atmosphere is used.

A second effect of the wrong furnace atmosphere has to do with the internal structure and physical properties of the steel being treated. Too little is known about the effect different furnace atmospheres have on the physical properties of steels; however, it is the general thought that this is important. To discuss this in full would occupy too much space; however, the curves shown in fig. 3 illustrate the effect which different atmospheres have on the toughness of tough and brittle "timbre" steels.

A tough timbre carbon tool steel is considered to be one which on hardening from 1550°F will be found to have a fine or silky grain structure in the hardened case section of a fractured ¾-in. diam sample. A coarse grain structure denotes a brittle timbre steel and toughness will increase with decreasing depths of case hardening. It will be noted in fig. 3 that next to heating in a lead bath, an oxidizing atmosphere provides the greatest toughness in brittle timbre steels. Tough timbre steels are but little affected by changes in the type of furnace atmosphere used. It is sufficient to say here that if the correct atmospheres are used as specified by the different tool steel manufacturers for their brands of steel, the heat treater cannot go wrong.

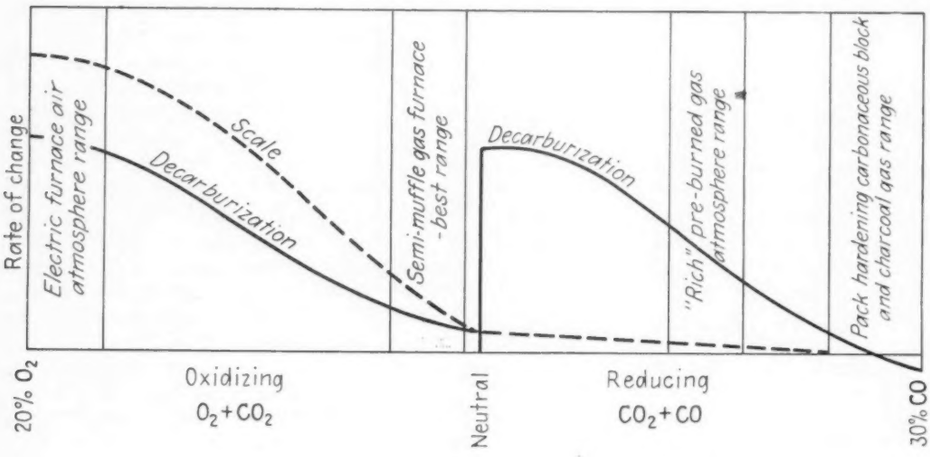

FIG. 4—Effect of different hardening furnace atmospheres on the scaling and decarburization rate of a steel (Columbia Tool Steel Co.).

Essentially, there are three types of furnace atmospheres: Reducing, oxidizing, and neutral. An oxidizing atmosphere is one which, in the case of a semi-muffle type furnace, is created by admitting more air than is needed to burn the fuel completely. In other words, we have an excess of air which contains free oxygen. An atmosphere having a reducing tendency may be present when an excess of combustible gases are present in the furnace operating with less air than that which is required to give complete combustion of the fuel. It follows that a neutral atmosphere is one in which there is a balance between the oxygen and the combustible gases and complete combustion takes place.

It was once the general opinion that only an oxidizing atmosphere causing the formation of a scale could produce decarburization. This is now known to be untrue, since it is quite possible to obtain very bad surface decarburization with a so-called reducing atmosphere, even though no scaling of the surface of the work takes place.

Fig. 4 illustrates the relationship which the per-

cent atmosphere composition bears to the rate of decarburization of a certain steel at an average hardening temperature. Note how decarburization takes place even with a reducing atmosphere although no scale is formed.

The following table shows the effect on the main iron constituents of the different common gases which may be present in a furnace atmosphere. It will be noted that the principal decarburization agents are oxygen, carbon dioxide, water vapor and hydrogen, while the principal carburizing agents are carbon monoxide and methane.

Common Furnace Gases

Main Iron Constituents	Carbon Dioxide	Carbon Monoxide	Methane	Oxygen	Water Vapor	Hydrogen
Iron Carbide	Oxidizing, Decarburizing	....	....	Oxidizing, Decarburizing	Oxidizing, Decarburizing	Decarburizing
Pure Iron	Oxidizing	Carburizing	Carburizing	Oxidizing	Oxidizing	....
Iron Oxide	....	Reducing	Reducing	....	....	Reducing

It is impossible in an open fire furnace such as the semi-muffle type to obtain a completely neutral atmosphere, even though, to all intents and purposes, the flame indicates that complete combustion is taking place. This is due to the fact that with the common fuel gases usually employed, the formation of water vapor occurs as a product of combustion. Hydrogen and some carbon dioxide are also always present in this type of neutral atmosphere, and these gases will, we know, cause decarburization.

Preparation of Atmospheres

In order to combat decarburization and scaling, the use of a specially prepared and controlled atmosphere is sometimes employed. The most common way of producing such an atmosphere for use in a muffle type furnace is to burn raw fuel gas with a certain proportion of air in the furnace chamber, in this way closely controlling the percentage of excess oxygen or excess of combustible gases. As stated above, this type of atmosphere will produce water vapor on burning, and will also possess some of the other decarburizing gases mentioned above. An improvement on this type of artificial atmosphere is to burn the gas in a separate combustion chamber using a definite ratio of air to gas, and then pass the products of combustion through a condensing unit in which the water vapor is removed from the burned gas. Further improvement on this method is to pass the products of combustion through a scrubbing unit containing purifiers such as sodium carbonate which will remove such other undesirable combustion products as sulfur and carbon dioxide. The use of a pellet of lithium is sometimes resorted to for removing traces of water vapor from prepared furnace atmospheres.

There are numerous other ways to create the desired atmosphere. To fully appreciate the complexity of the problem which the heat treater is faced with in controlling the furnace atmosphere in such a way as to protect the steel being treated, it is necessary to study the effects of the different gases at different temperatures. It is quite possible with a given furnace atmosphere to have no decarburization or scaling at, say, 1500°F, whereas if the same atmosphere is used in heat treating at 1900°F, considerable decarburization of the surface of the steel will take place.

Probably the easiest and most practical method of gauging the oxidizing nature of a furnace atmosphere is to observe its effect on a small block of wood placed on the furnace hearth. This test is performed as follows:

To estimate oxidizing atmosphere between 1 pct oxygen and 5 pct oxygen, heat the furnace to the proper temperature and put a small block of wood (not over ¾ in. cube) on the hearth and close the door.

If the wood smokes and chars, but shows no visible flame, the atmosphere contains less than 1½ pct oxygen. It may even be reducing.

If the wood block smokes and then shows intermittent flashes of pale blue flame (with no yellow in the flame), the oxygen is between 1½ and 2½ pct.

If the flame from the block is about half blue and half yellow, the oxygen is between 2½ and 4 pct.

If the wood block burns with a steady yellow flame—and if the residual charcoal glows pretty much all over—the oxygen is about 5 pct or above.

To judge excess oxygen of about 8 to 10 pct, put a small lump of soft coal on the hearth and observe it through the peephole. Under 4 pct oxygen the coal will smoke, but will show no flame. Between 4 and 8 pct there will be flame and smoke mixed. At 8 to 10 pct oxygen, there will be a trace of smoke—the coal will burn with a clear luminous flame—and the remaining coke will definitely glow.

The above test can be used to estimate oxidizing atmospheres in a gas-fired furnace, an oil-fired furnace, or a gas curtain electric furnace. The most accurate method of determining the composition of a furnace atmosphere is by making an actual analysis of the gas in the furnace heating chamber. When this is carried out on a furnace equipped with atmosphere control equipment, it is possible to determine the correct gas-air ratio necessary to obtain the desired atmosphere. Unfortunately, this method of control is not too accurate, since in certain localities the gas analysis varies continually.

Thomas J. Bannan, president

AGMA Discuss Problems

At the 30th Annual Meeting of the American Gear Manufacturers Assn., discussions were equally divided between technical developments and the commercial aspects of the business. The latter were emphasized particularly by the recent 13 pct price increase granted the industry by OPA

GEARS and gearing problems, cost analysis, inspection, and labor problems—some 125 members of the American Gear Manufacturers Assn. ran the gamut of these subjects at the 30th annual meeting of the group on June 3, 4, and 5 at Hot Springs, Va. The main order of business was divided between the technological developments in the industry, which included the adoption of several new standards, and the various commercial phases of the business.

The only technical paper formally presented at the meeting was "An Operating Test for the Evaluation of the Surface Durability of Gears," prepared by T. H. Wickenden, G. R. Brophy and A. J. Miller of the development and research division of International Nickel Co., Inc. The paper dealt with an improved testing machine employing the "four-square" principle designed to conduct tests on gears under controlled conditions of load, temperature, speed and lubrication, and to eliminate as far as possible the unavoidable, complicating variables encountered in the manufacture of gears. The primary concern in the tests is with the deterioration of the teeth surfaces, which fail by pitting rather than with the beam fatigue strength of the teeth. Test data were presented to demonstrate the results obtained on gears made of SAE 4645 steel, quenched and tempered to three hardness levels, ranging from 30 to 45 Rc. The end point of each test was determined by a measurement of the change in the noise developed, with the aid of a noise meter.

The test specimen examined was a 28 tooth helical gear with a PD of 3.5302 in.; a normal pressure angle of 20°; a helix angle of 7.5°; and a tooth face width of 1 in. A pair of gears is opposed and rotate in different planes, which include an angle of 15°, thereby developing an elongated eliptical contact area which is somewhat resricted to the central part of the tooth and eliminates the complication of end effects. The upper limit of stress with the gear described is about 250,000 psi.

The machine operates on the four-square, or closed circuit principle, in which two pairs of gears are opposed. One pair is a permanent part of the machine and the other pair is the test specimens. Each gear box is kept filled with oil, pumped during operation in a continuous flow under a constant pressure of 30 psi. The oil supply is maintained at any desired temperature to ±5°F by a thermostatically controlled immersion heater and a water cooled radiator.

A recording power meter was connected to the motor power line to show power losses as the teeth surfaces deteriorated under test conditions. In actual test, however, the power record, together with visual examination, demonstrated that gear efficiency continued to improve even after pitting was well advanced. On the other hand, the deterioration of any of the rotating parts of the system—joints and bearings—was recorded, but because of its unreliability this method of indication was discarded. It was found that, when gears pitted seriously, the volume and tone of sound emitted from the machine changed audibly. This led to the inclusion into the testing machine of a noise meter that measures noise levels in terms of millivolts.

Among numerous tests already conducted by the authors were some on gears made from SAE 4645 steel, running 0.48 pct C; 0.68 pct Mn; 1.81 pct Ni; 0.23 pct Mo; 0.016 pct P; and 0.015 pct S. Forged blanks were annealed, turned and splines and teeth rough cut. The rough gears were then oil quenched and tempered to three levels of hardness: 30 Rc, 36 Rc and 43 Rc, after which they were finished on a Fellows gear shaper. All tests were conducted at 215°F in the manner of fatigue tests in order to develop the stress life relation and to establish stress below which gear life is indefinitely long. The data are contained in table I. The indicated stresses for gear lives of 5×10^7 cycles are plotted against the hardness of each group, a curve is obtained that is characteristic of fatigue in that higher stresses for indefinite lives are found as the hardness increase. As a matter of fact, the performance of the permanent gears in the machine furnishes excellent support for the expectation that this trend will continue to higher hardnesses than those studied. The permanent gears are made of carburized SAE 4615 steel, hardened and tempered to 63 Rc, and have withstood, without distress, the summation of all tests conducted, a total of more than 500 million cycles of calculated stresses ranging between 150,000 and 250,000 psi.

Fatigue failures do not result from repeated compressive stresses, but only from repeated tension stresses. The tension stresses that cause failure in these gear tests, according to the authors, must be of a lower magnitude than the calculated compressive stresses. The authors plotted a curve to show the values of the maximum safe repeated tension stresses for steels of the hardness investigated. These stresses

Confronting Industry . . .

John O. Almen

General Motors Research Laboratories, received the Edward P. Connell Award and Citation of AGMA, at its 30th annual meeting, Hot Springs, Va., June 3, 4, and 5.

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are about 80 pct of the tensile strengths and about 60 pct higher than the limiting safe stresses for complete reversal.

Stresses that initiate failure, however, must not be simple tension because they originate from two sources: (1) The tension component of the operating compressive stress; and (2) The tangential tensions in the teeth surfaces developed by the action of the teeth during operation. The latter source is believed to be more important because of conditions peculiar to the tests. The first sign of tooth distress during the tests is a scoring action which develops a series of arrowhead markings with their apexes on the pitch line, pointing in the direction of the sliding.

This frictional force is believed to develop a high degree of tangential tension stress in the tooth surface and is evidently more severe in the driving tooth, since it always pits first and more extensively. This is probably associated with the fact that the surface metal in the driving gear is pulled away from the pitch line both during engagement and disengagement, whereas, in the driven gear the tendency is to move metal toward the pitch line. This is so characteristic that inspection reveals which of a pair of gears was driving and which was driven. Once started, the spread of pitting is rapid and destructive, and at this stage the noise emitted increases continuously.

The authors of the paper indicated that the use of the new machine as a laboratory tool has been satisfactory and the work is being continued. It is hoped that, ultimately, the work will be able to compare materials of gear construction and their treatments, but it has been learned that many factors must be closely controlled. The immediate problem is to specify a surface finish for gears that can always be duplicated, since surface quality has been found to be of utmost importance. The investigations are to determine the quality and hardness conditions of the material, and do not relate in any way to gear design. John O. Almen, in commenting on the paper, indicated that the relative importance of surface finish on gears is getting a great deal of attention, but as yet a procedure has not been developed to evaluate surface finish.

The technical committees of the American Gear Manufacturers Assn., meeting throughout the three-day conference, gave their reports to the group on Wednesday, June 12. It was recommended by the Herringbone and Helical Gear Committee that separate tables be set up for gear motors and speed reducers, and that rolling mill gearing be removed from the present standards since it is a highly specialized type of gearing. Spur gear practices, in development under the Spur Gear Committee for some time, have been approved and are in the process of being edited, preparatory to their publication as a standard.

The committee on bevel gears indicated that revisions to better balance fatigue strength between the gear and pinion have been held up by new tests, but the report will be made probably at the association's fall meeting. Surface evaluation of gear teeth came up for study under the committee on fine pitch gears, and it was decided that in conjunction with the committee on gear inspection, a symposium would be developed for the fall meeting on surface evaluation, latest techniques, and field tests, and authorities on surface finish and evaulation would be invited to participate.

Data accumulated from aircraft manufacturers on gear evaluation will be presented at the fall meeting. This performance data, it is believed, will form the nucleus for the development of mathematical formulas that can be used to precisely predict gear performance. Currently, aircraft technique is to over-design, a situation that must be corrected in order that performance will be improved and weight will be reduced. Data must be collected on failure of gears of all types in order to develop mortality tables, which will result in better and cheaper gearing.

The committee covering hobbing and gear shaping is planning a long-range program on hobbing and gear cutting tools, covering the various types of hobs and their applications. The committee on tooth form is planning to take the data that have been accumulated on spur gears and continue development from that point. The work will cover helical and herringbone forms.

The committee on gear materials has agreed to the revisions recommended to the tentative standards on cast-iron gear blanks. These changes include revisions in Brinell hardness specifications and deletions to make the specifications simpler and more applicable to use. Bronze blank standards are being studied also and it is expected that revised specifications will be advanced sufficiently to propose them as tentative standards at the fall meeting. The committee on gear inspection listed several new standards that have been adopted or will be presented to the membership for acceptance. Future work by the committee includes the evaluation of surface finishes for coarse fixed gear teeth.

At the annual election of officers, American Gear Manufacturers Assn. elected Thomas J. Bannan, president; R. B. Tripp, vice-president, and Walter L. Schneider, treasurer. N. C. Goin continued as execu-

Raymond B. Tripp, vice-president

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tive secretary. Mr. Bannan is president of the Western Gear Works, Seattle, its associate organization, the Pacific Gear and Tool Works, San Francisco, the Webster-Brinkley Co, and the Hallidie Machine Co., Seattle. He served as vice-president of AGMA last year, and replaces Paul W. Christensen, of Cincinnati Gear Co., Cincinnati.

Raymond B. Tripp, who succeeds Mr. Bannan as vice-president of AGMA, is vice-president and sales manager of the Ohio Forge and Machine Corp., Cleveland. He served as AGMA treasurer for the past two years.

Walter L. Schneider elected treasurer of the AGMA, is vice-president in charge of sales for the Falk Corp., Milwaukee. He has served on various committees of AGMA for some years.

The association also elected an executive committee for the 1946-47 season, which consists of: Chester B. Hamilton, Jr., president of Hamilton Gear and Machine Co., Toronto; Fred H. Hoge, president of the W. A. Jones Foundry & Machine Co., Chicago; Walter W. Trout, vice-president and general manager of the Lufkin Foundry & Machine Co., Lufkin, Tex., and Fred W. Walker, vice-president of Philadelphia Gear Works, Inc., Philadelphia.

The American Gear Manufacturers Assn., through its Committee of Awards, designated John O. Almen to receive the Edward P. Connell Award for 1945. The award was presented to Mr. Almen at the annual dinner, June 4. The Edward P. Connell Award was established in 1942, and Almen is the fourth recipient of the medal and citation.

John O. Almen, head of mechanical engineering dept. No. 1, General Motors Research Laboratories, has been active in mechanical engineering fields for many years. He spent considerable time in the development of barrel-type aircraft engines in cooperation with the Army Air Corps at McCook Field. He has been active since 1926 in automobile engineering problems ranging from bodies to suspension systems, and from engines to rear axles, transmission and rear axle gears. He fostered such innovations in automotive engineering as resonance intake and exhaust silencers, automatic valve adjusters, automatic transmissions and transmission controls (Hydromatic), plate spring clutches, and several other ideas that are now standard practice in auto construction. During the war, Almen devoted most of his time to problems of material strength, under the auspices of the National Defense Research Council.

Concerning the commercial aspects facing the gear industry, the association spent considerable time. Better cost and estimating methods, incentive programs in plants, price relief, marketing and sales practices, maintenance of shop records, and similar questions were brought before the meeting. The association set up a forum type meeting to handle the commercial questions. Members of the forum were the following: Paul W. Christensen, president of AGMA and president of Cincinnati Gear Co.; Thomas J. Bannan, Western Gear Co., L. R. Botsai, Westinghouse Electric Corp.; Howard Dingle, Cleveland Worm Gear Co.; J. Harper Jackson, Jackson Gear Co.; R. B. Salinger, Massachusetts Gear Co., and W. L. Schneider, Falk Corp. The questions were submitted to the forum leaders prior to the meeting, and their answers were more or less formally prepared.

The subject of the relation of cost to profit and prices was commented on by several of the forum. T. J. Bannon contented that each contract in itself should yield a profit, and that the standardization of cost and cost practices is badly needed in the gear industry. J. H. Jackson pointed out that the profits of the gear industry during the past 20 yr have not been on as high a level as the profits in other industries. He pointed to the OPA survey as proof of the fact that gear companies do not know their costs. Howard Dingle stated that the practice of spreading overhead over the volume of anticipated business makes it difficult to establish definite costs. Material and labor costs can be exactly calculated, but where overhead charges against specific jobs depend upon anticipated volume of sales for a given year, they are difficult to determine. He said that better practice is to estimate such costs on a normal year such as 1938 or 1940, and not on anticipated business volume.

On incentive systems and problems arising from their use, L. R. Botsai told of the standard time study system in use at Westinghouse, which includes, in addition to straight production, such service jobs as painting, boxing, and crating products. In one instance alone, he claimed that cost had been lowered 50 pct through the installation of the incentive system. He said that the company had experienced no resistance to incentive systems by the workers, and the unions likewise had not objected to them. On the other hand, T. J. Bannan stated that Seattle and San Francisco unions oppose incentive plans. One of the main

advantages pointed out for the incentive system, in addition to cost reduction, was a fairer wage standard for the employees. Formerly it was possible to take care of inequities in skill of workers, by pay rates, but now unions force uniform rates. Incentive systems take care of the more skillful operators.

W. L. Schneider expressed the belief that whether or not incentive plans work depends upon how they are administered at the shop foreman level. These men know better than anyone else in the company, including the standards department, the individual conditions of the work, machinery, material, etc. On standard runs there are few difficulties, but in specialized work the foreman must be able to make certain adjustments in rates.

It was the belief of members of the forum that an increase in gear prices will result because of the increases in labor and material costs and the drop in productivity. They felt that technological development has been insufficient to warrant a decrease in price. R. B. Salinger broke the cost elements down into two groups, those that tend to reduce costs and those that tend to increase costs. As to the former, production volume in the next two years should reduce costs, as should the shorter work week with its reduction in overtime and better efficiency; younger labor which is more efficient and more productive; technological improvements that were war developed and improve quality; and the expected decrease in Federal taxes. On the increased costs side of the ledger, he said, there were such factors as greater selling expenses, higher wage rates with payroll levies that increase accounting costs; and a general decrease in labor efficiency, not very commensurate with the higher rates. Manhour production is definitely down from both the prewar and the war period. The latter two of the factors that tend to increase costs, increased wages and decreased efficiency, Salinger said, more than offset all the factors that tend to decrease costs.

W. L. Schneider stated that there will be a higher premium on good management in the years to come. With a decrease in output per man, management must be good to bring up the employee efficiency.

Discussing the ability, mechanics, and advisability of gear shops to forecast or prepare for markets, L. R. Botsai recommended a careful study of statistics, market demands, capital expenditure anticipated, and all the rest of the data and forecasts of all sources available. W. L. Schneider pointed to two specific phases of market forecast. The first was through a study of trends and conditions of business in general and the second was a study of such factors as affect the individual company. The latter, he claimed, is more specifically important to the company. The anticipated needs of a company's best customers should be sought, since a handful of customers usually account for the great bulk of a company's production. As to business in general, he said that a close examination of automotive forecasts is highly important since it is the greatest single industry in the country, and also a heavy user of the industry's products. Schneider predicted that the current trends toward high labor rates will result only in greater mechanization of industry in general, and the result will be a gain to the gear industry. Further, the wear and tear on equipment throughout the war period also bids well for the gear industry, since the bulk of this equipment will have to be replaced shortly.

N. C. Goin, executive secretary

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George H. Sanborn, chief field engineer, Fellows Gear Shaper Co., Springfield, Vt., showed a motion picture to the AGMA members on the Art of Gear Generating and Gear Manufacturing Equipment. It covered the theory and development of the involute curve, design and action of gear teeth, applications of the generating principle, various types of gear cutting and finishing equipment and the various types of gear measuring and testing equipment.

TABLE I

Data from Gear Fatigue Tests on SAE 4645 Steel

Heat Treatments							
Quench Temp., °F	Draw Temp., °F	Rc Hardness	Loading Torque, Ft Lb	Calculated Stress, Psi	Life in Cycles of Stress	Probable Stress, $5x10^{-7}$ Cycles	Remarks
1550	800	43.5	650	248,000	2,400,000		
		43.5	650	248,000	2,950,000		
		43.5	500	228,000	4,570,000		
		43.5	500	228,000	4,800,000		
		43.5	430	217,000	7,600,000		
		43.5	410	214,000	25,200,000		
		43.5	400	212,000	12,900,000		
		43.5	400	212,000	32,000,000	212,000	No Failure
	1025	36	650	248,000	1,080,000		
		36	500	228,000	2,400,000		
		36	410	214,000	5,100,000		
		36	360	205,000	12,000,000		
		36	340	202,000	37,980,000	203,000	No Failure
	1100	30	340	202,000	5,700,000		
		30	340	202,000	6,000,000		
		30	300	194,000	17,100,000	195,000	No Failure

Determination of Manganese and Chromium in High Chromium Steels

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By H. W. TOMB

Chief Chemist, Tubing Specialties Div.,
Gary Works, National Tube Co.

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THE high chromium content of stainless steels tends to defeat any attempt at rapid solution, thus extending the time required for analysis. It also interferes in the determination of manganese. The rapid, accurate determination of the various elements in stainless steels is a subject that is under continual investigation. Modification of existing methods for the analysis of manganese and chromium that are giving excellent results have been developed at Gary Works of National Tube Co.

The only rapid methods for the analysis of manganese developed to date are the perchloric acid methods. Considerable difficulty was encountered in using any of the methods as published. Investigation has disclosed that rather close control of the pH was necessary for obtaining consistent results. However, as the result of a rather extensive research, a modification of the Fred Wilson Smith method has been developed to produce accurate determinations in a minimum of time.

For an article dealing with the determination of tungsten and columbium in stainless steels, see THE IRON AGE, *April* 11, 1946, *p.* 66.

Procedure—Weigh 300 mg of sample into a 300 ml erlenmeyer flask, and add 5 ml HCl (1:1) and 25 ml $HClO_4$ (60 pct). Place on edge of hotplate until solution is complete, then move to center of hotplate and boil down to fumes of perchloric acid. When flask is clear of fumes, add approximately 0.25 g of NaCl and boil until flask is clear of brown fumes of CrO_2Cl_2. Add successive portions of NaCl until no more chromyl chloride is given off (this will usually take three additions of NaCl). Cool flask and add 150 to 175 ml distilled water and 10 ml of 1 pct $AgNO_3$. Bring to a boil, remove from hotplate, and immediately add 10 ml of 30 pct ammonium persulphate. As soon as the excess persulphate has passed off (small bubbles no longer come to the top), cool to 20° C (68° F) in a cold bath. Titrate with 0.01 N sodium arsenite. The sodium arsenite should have been standardized by use against National Bureau of Standards samples and the proper factor obtained.

Using this method, a determination can be completed in from 15 to 20 min. as compared to 1 to 2 hr by the zinc oxide method. The accuracy is considered equal to or greater than that obtained by the zinc oxide method.

Two methods of analysis for high chromium steels have been used in the past. The perchloric acid method gave rapid solution, but unreliable results due to incomplete oxidation and loss of chromium as CrO_2Cl_2. The persulphate method was accurate, but the time required to evaporate the sample several times with sulfuric acid was far too long for production work. It seemed feasible that some combination of the two methods could be made combining the rapidity of the perchloric method and the accuracy of the persulphate method. The following method has been used for some time with greatly increased accuracy while retaining the speed of the perchloric acid method.

Procedure—Dissolve the sample in a 600 ml-beaker using one part of $HClO_4$ to two parts of H_3PO_4. Use 40 ml of the mix for a 1-g sample and 30 ml for a 500-mg sample. When solution is complete, remove from the hotplate and cool. It is not necessary to evaporate to fumes of $HClO_4$. Add 300 ml water and boil for 5 min. Add 10 ml of 0.5 pct $AgNO_3$, heat nearly to boiling and then add 20 ml of 15 pct ammonium persulphate. Boil the solution for 10 min after the red color of the permanganic acid shows. Destroy the red color in the usual way with 1:3 HCl and boil for 5 min after the last trace of pink disappears. Titrate and calculate in the usual manner.

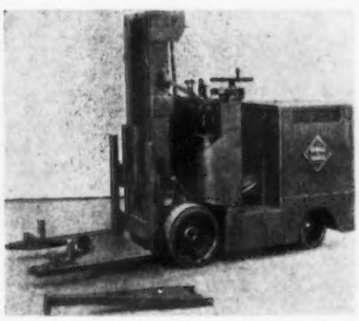
The time required for one analysis is ½ hr as compared to ½ hr by the usual perchloric method, and 4 or more hours by the persulphate method. The accuracy is the same as for the regular persulphate method.

New Equipment . . .

Material Handling

Recent developments in lift trucks, loaders, roller and gravity conveyors, boosters, hoists, and other material handling equipment and accessories are described in this week's issue.

TO handle ladles of molten metal in foundries, an attachment for fork trucks has been manufactured by the *Elwell-Parker Electric Co.*, Cleveland. This attachment is in the form of an apron which slips over the tines of the fork and is held in place with two bolts. The outer edge of the apron is cut away in semicircular shape, according to the circumference of the ladles. Brackets are welded to the upper edge of the apron in alignment to conform with arms on the ladle. The ladle, filled with molten metal, is picked up and transported to molds in a fraction of the time formerly required, it is said, conserving heat and expediting the casting



operation. This particular fork is of the notched type for handling railroad car wheels in upright position. Trucks with this fork and attachments are enabled to transport the ladles in wheel foundries, carry out cast wheels while still red hot, and thereafter move as many as five finished wheels on the fork at one time.

Truck Loader

DESIGNED to lift, carry, stack and tier unit package loads weighing up to 1000 lb, a compact, lightweight fork truck has been announced by *Clark Tructractor*, 1944 Madison St., Battle Creek, Mich. This product, known as the Trucloader, has been adapted for

fast, low cost loading and unloading of highway trucks and trailers. It is maneuverable in narrow aisles and has a turning radius of 57 in. Its lightweight makes it possible to run in and out of trucks and trailers, and it can be used in elevators which cannot handle heavier units. The truck utilizes the principle of unit loads packed on suitably designed pallets.

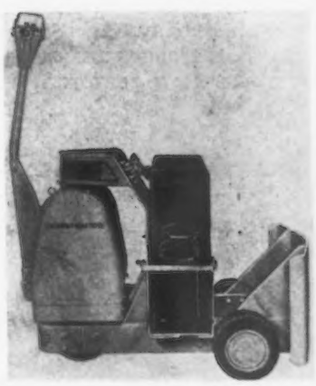
Apron Conveyor Unit

A SELFCONTAINED, heavy-duty apron conveyor unit has been announced by *Chain Belt Co.*, 1600 W. Bruce St., Milwaukee 4. This roller-supported apron feeder is furnished in several widths and with centers ranging from a mini-

mum of 4 ft 7 in. to a maximum of 9 ft 1 in. varied by 18 in. increments. This type of feeder can be used under bins and hoppers for heavy lump material such as ore and pit-run gravel and rock. At a normal speed of 10 fpm, handling 100-lb material, capacities of these units will run up to 80 tons per hr. The heavy steel chain belt rides directly on large diameter traction rollers, which, it is claimed, means longer chain belt life and reduced power consumption.

Hand Tractor

KNOWN as the Transtractor, an electric-propelled hand tractor has been developed by the *Automatic Transportation Co.*, 55 W. 87th St., Chicago 20. This small, maneuverable push-pull type mate-



rials mover will push or pull a 6000-lb trailer load all day or up to 20,000 lb intermittently, depending on plant conditions. Finger-tip control enables one man to handle any size or type of load. Forward and reverse drive controls are push-button type operated from the guide handle. Two forward and two reverse speeds are controlled by the vertical angle of the guide handle. Drive brakes are applied by the automatic return of the guide handle when released, to upright position.

The Transtractor is equipped with a heavy-duty bumper plate for pushing and a coupler is available for towing operations.

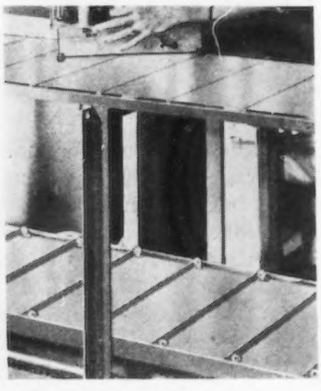
Booster Conveyor

EQUIPPED with either a cleated belt or a rubber grip-top belt, the Power Helper, a compact ma-

neuverable machine, applicable to loading and unloading delivery trucks, has been introduced by the *Metzgar Co.*, Grand Rapids 4, Mich. This machine features automatic belt tensioning and has a variable belt speed of 40 to 50 fpm. The basic unit has a 6-ft exposed belt surface and is adjustable from a horizontal 18-in. height to a 45° pitch. It is suspended by heavy compression springs and equipped with ball bearing, rubber tired wheels. Side troughs may be added for use as a parts conveyor.

All-Steel Conveyor

AN all-steel conveyor, called the Steelok, has been manufactured by *Steel Parts Mfg. Co.*, 222 S. Morgan St., Chicago. The con-



veyor is made of cold-rolled steel belt plates linked together in such a manner as to give virtually noiseless operation. It is built in 90-ft lengths, giving a continuous, unbroken surface for assembly operation where the unit construction must be taken from conveyor and returned to it in its trip down the assembly line.

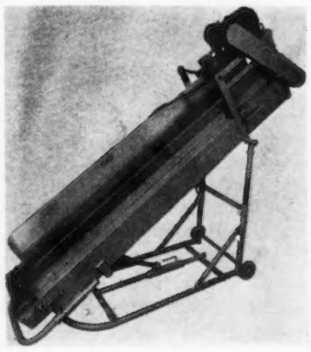
Cleated Belt Booster

TO speed production and increase labor efficiency, the *Island Equipment Corp.*, 101 Park Ave., New York 17, has placed on the market an elevating conveyor known as the Island ultimate belt booster, used for automatically conveying packages, boxes, cartons, up a grade, from one level to another. It consists of an adjustable frame which can be elevated from 10° to 45°, the maximum elevation being 16 ft. An endless cleated belt operates around two rollers located

at top and bottom of the frame. The belt travels at 50 fpm; cleats are arranged normally on 5-ft centers. The entire assembly is carried on four 6-in. ball bearing steel casters for easy mobility.

Portable Stamping Conveyor

A PORTABLE, power-driven, endless belt conveyor has been designed by the *Rapids-Standard* Co., Inc., 440 Peoples National Bank Bldg., Grand Rapids 2, Mich., to withstand the abuse of press room operations. The Press-veyor is compact and ruggedly constructed of heavy gage formed steel and steel tubing. A wide base provides stability and is said to eliminate the hazard of tipping. The two-wheel design of the base allows the conveyor to be moved about readily. The belt is a 32-in., 4-ply canvas type, stitched with heavy twine and impregnated to make it pliable, waterproof and weatherproof. The Press-veyor is equipped with lifting handles at both ends and may be raised to any desired delivery position. Two standard models are available: the 6-ft model adjustable up to a 39° operating pitch, and the 8-ft model adjustable up to a 44° pitch. Both models come in two



widths: 15⅜ in. using a 12-in. belt, and 20 in. using a 16-in. belt. Power is supplied by a 1/3 hp right angle gear head motor operating on 115, 220 or 440 v.

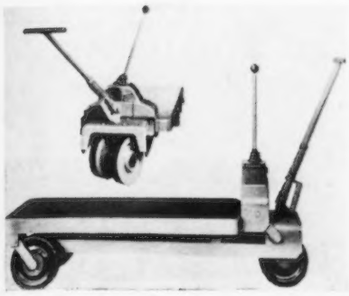
Lifting Arm

A POWER truck equipped with a horizontal, nonswivel type boom, moving vertically with its shoulder riding in the upright columns of the truck, has been developed by *Elwell-Parker Electric Co.*, Cleveland 14, for lifting and transporting many types of loads in manufacturing operations. This mechanism is said to be useful for single, heavy and bulky objects to which a hook, chain, rope or cable may be attached. The truck can carry loads up to 3000 lb. The boom is available in lengths of 72, 66 and 60 in. from face of uprights. At lowest point the hook is 22 in.

above floor level; at highest, 8 ft. The boom may be made interchangeable with a platform whereby a greater variety of loads may be transported.

Lift Truck

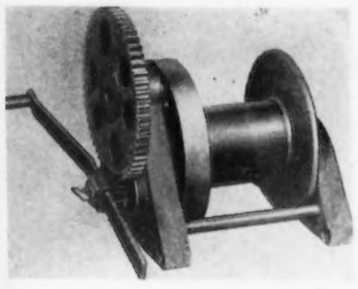
THE development of a standardized lift truck, called Load-Lift, has been completed by the *Market Forge Co.*, Everett, Mass. The Load-Lift utilizes the hydraulic principle in lifting. Sealed ball



bearing, all-steel wheels have been specified for the truck, although plastic wheels and rubber wheels are also available. A feature of the lifting mechanism is the fact that each stroke is a power stroke; there are no lost motion and no ineffective backstrokes. The platform remains stationary at any height. Where floors are smooth and free from obstruction, the skid platform legs need only be elevated a fraction of an inch to allow the load to be moved. When obstructions are encountered, a few strokes on the lifting lever will allow the truck to negotiate. In the Load-Lift the lifting handle has been divorced from the lifting mechanism, thus eliminating the possibility of accidents. An overload safety valve allows only a 20 pct overload, before coming into play.

Hand Power Winch

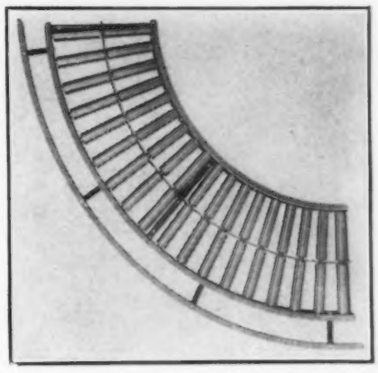
KNOWN as the Handiwinch, an all-steel construction hand power unit, consisting of a drum mounted between two side frames



rigidly held together by two threaded shouldered tie bolts and a stationary drum shaft, has been announced by the *American Hoist & Derrick Co.*, St. Paul 1. The drum shaft is welded to one side frame and pinned to the other. The drum can be driven either through 27:1 double reduction gears for heavy loads, or 4.5:1 single reduction gears for light loads. A band brake is furnished which engages with a drum mounted on the high speed pinion shaft, providing safe handling of heavy loads without creep. A ratchet forms an integral part of the brake drum, which is engaged by means of a pawl for the safe holding of loads. The winch can handle a 10,000-lb load with a 70-lb crank load, 20-in. crank and a 27:1 gear.

Gravity Roller Conveyors

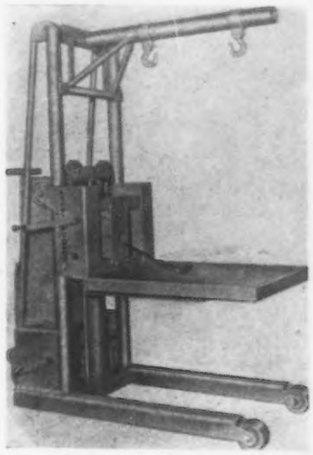
FOR the handling and transportation of cartons, bales, packages, boxes and crates, a packaged line of gravity roller conveyors has been designed by *Lyon Metal Products, Inc.*, Clark St., Aurora, Ill. These conveyors are built with



trestle supports designed and well-braced for maximum weight, yet light enough, it is said, to be easily moved about. Regardless of width, they are good for safe loads up to 200 lb. Several arrangements of units can be combined in straight runs and curves. Complete units are available in these sizes: three straight sections, all 10 ft long and in three widths, 12 in., 18 in., and 24 in.; three 90° curved sections, 12, 18 and 24 in. wide; two trestles 18 in. and 24 in. wide.

Die Separator and Winch

FOR use with a 2000-lb capacity, high-lift truck in die handling operations, a die separator has been designed by the *Lyon-Raymond Corp.*, 2599 Madison St., Greene, N. Y. This unit consists of a removable boom with adjustable hooks. The top section of a die is fastened by chains to the hooks and the lowering of the platform accomplishes the separation of the two sections of a die. The boom is a hook-over type requiring no bolts for attachment. For pulling dies and fixtures in and out of racks



and presses, a gear type winch with a ratio of 38:1 is also available.

Magnetic Disk Brake

DESIGNED for use on applications up to 100 hp motor-driven loads, a Series 1300 magnetic disk brake has been announced by *Stearns Magnetic Mfg. Co.*, Milwaukee 4, to augment its present Series 800 and 1000 brakes. This Series 1300 brake can be supplied in either floor or motor mounted types and for either ac or dc. Simplified design provides replacement of any part without disturbing the brake assembly.

Work Table

TO facilitate assembly, inspection and packaging operations, an all-purpose mechanized-conveyor work table has been offered by the

Island Equipment Corp., 101 Park Ave., New York 17. This Unitable can be asembled in as many 10-ft units as may be desired. The conveying belt is operated by the company's Powerpac unit, at a cost, it is said, of only 2 to 3¢ per hr. Any fixed or variable speed can be supplied.

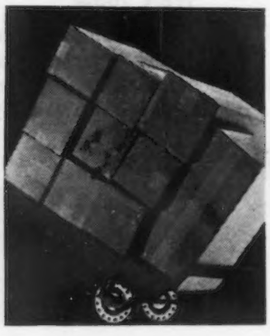
Portable Air Hoist

WITH rated capacity of 17 fpm with full load of 1000 lb, a lightweight portable air hoist has

been developed by the *Keller Tool Co.*, Grand Haven, Mich. This hoist is housed in a one-piece alloy casting, is equipped with an air motor of vertical piston design, has a fully mechanical brake, and automatic safety limit stops. The hook-to-hook dimension of the hoist is 13¼ in.; wall clearance is 5 in. and overall length, 14½ in. The unit, which weighs 30 lb, can be placed in position by one man unaided. A 500-lb capacity hoist is also available.

Industrial Wheel

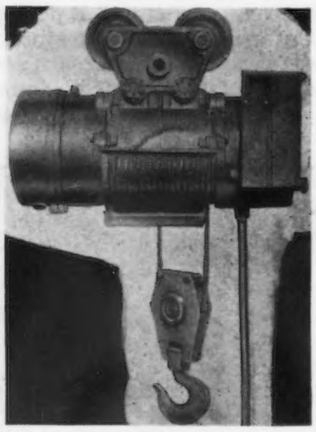
DEVELOPED at the request of the Navy for tail-wheel replacements on carrier based aircraft, during the war, the Grizzly tread-lock wheel has now been adapted for industrial equipment and replacements by the *Thermoid-Grizzly Wheel Sales Div.* of the



Thermoid Co., 945 W. Washington St., Chicago. The feature of sealed in lubrication is said to insure proper and automatic lubrication to the sealed precision built bearings, for life. Breather holes in the casting allow the rubber tire to expand under pressure, and contract when the pressure is removed. The cut resistant tread is tough and will not pull apart or chunk-off under any condition, it is said, yet will not cut or mar surfaces. The Grizzly wheel is available in standard sizes of 6 in., 8 in., 10 in. and 12 in.

Small Electric Hoist

ONE of the smallest, lightweight electric cable hoists available has been introduced by the *Lisbon Hoist & Crane Co.*, Lisbon, Ohio. Known as the Bob-Cat model, this hoist is made of steel forgings and castings in practically three sections, plus the cable. The motor is entirely enclosed in the drum, with proper heat dissipation



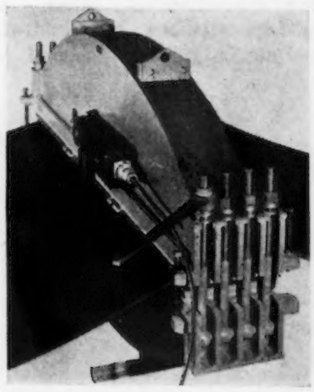
construction. It is ball bearing throughout, with gears of heat-treated alloy steel.

Cargo Hook

REPORTED to be applicable to many difficult hoist and loading problems, a safety cargo hook developed for the Navy for handling simultaneously three cargo nets with a total load of 3500 lb, has been announced by the *American Chain Ladder Co.*, 151 E. 50th St., New York 22. This hook has a grab opening of 3 7/16 in., while the diameter of the bail opening is 4 1/16 in. It will tolerate, it is said, loads exceeding 25,000 lb. This new hook features self-mousing action which prevents hook straightening and load slippage.

Belt Vulcanizer

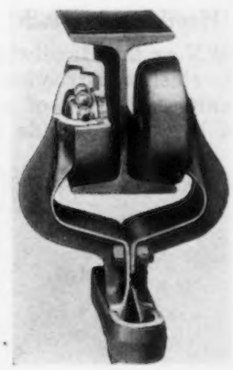
EQUIPPED with a platen 7 ft. across and 1 ft wide for vulcanizing belts 6 ft wide and of any thickness, a belt vulcanizer, said to be the world's largest, has been manufactured by the *James C. Heintz & Co.*, 3740 West 143rd St., Cleveland. The platens on flat irons



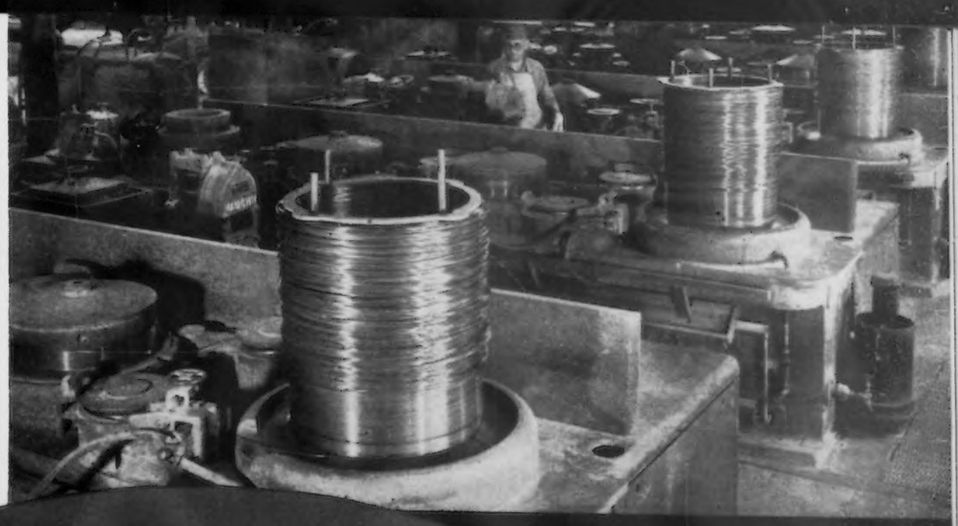
each contain over 1000 sq in. and exert a minimum pressure of 100 psi. Platen temperatures of 287° under operating conditions are automatically controlled with a variance of less than 6 pct at any point of the platen area, it is said. Belt vulcanizers range from 6 in. to 5 ft cross section.

Conveyor Trolley

A FREE - ROLLING conveyor trolley, having no wheel shafts or spindles, has been developed by the *Link-Belt Co.*, 307 N. Michigan Ave., Chicago. The two basic elements, the wheel and one-piece bracket, form the deep inner and outer races of the bearing. The inner bearing race, being a part of the wheel forging, revolves within the outer race formed by the head



of the trolley bracket. Protective felt seals and adequate lubrication reservoirs are important features of the design. Wheels and brackets are drop-forged steel with ball races accurately machined and hardened.



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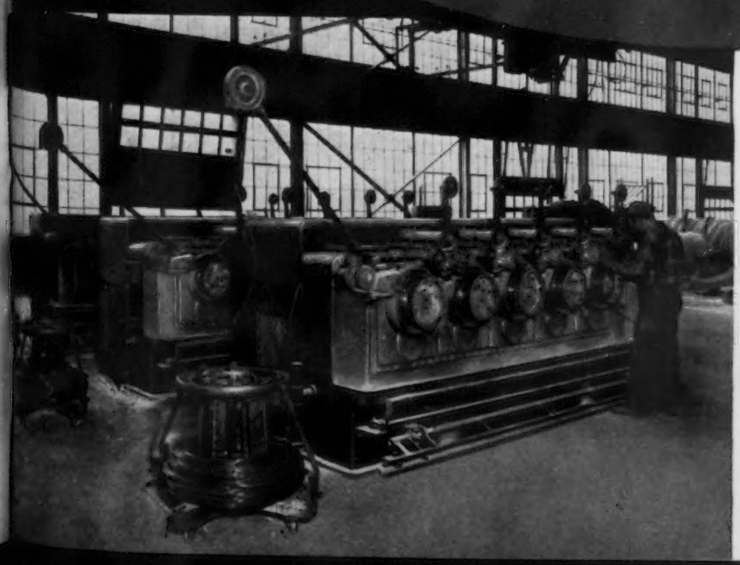
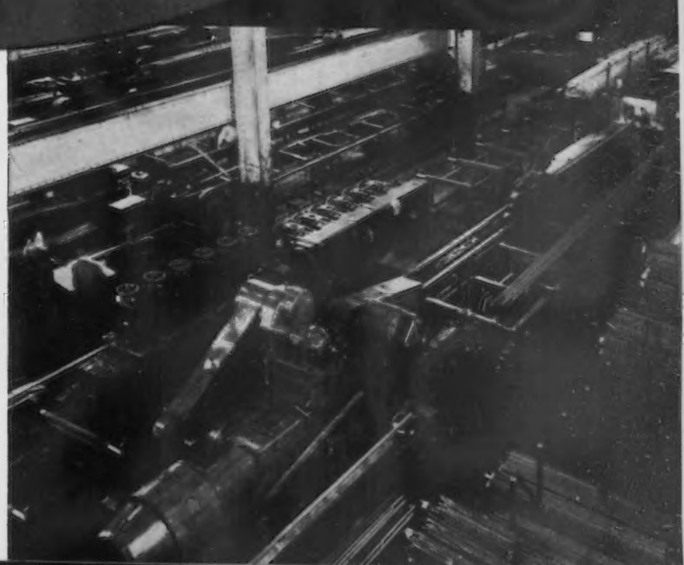




Assembly Line . . .

WALTER G. PATTON

• Industrial research moves forward at Ford and Army's air base at Wright Field . . . Change in GM executive setup concentrates operations at Detroit.

DETROIT—Industrial research moved forward during the past week along a front that was sufficiently broad to include the Ford Motor Co., the Air Materiel Command of the Army Air Forces and Vannevar Bush, Director of the Office of Scientific Research and Development.

At Dearborn, Henry Ford II revealed plans for a research project that will cost Ford $50 million and require 8 yr to complete. At Dayton, Lt. Gen. Nathan F. Twining, Commanding General, Air Materiel Command held a 3-day National Press Conference during which the press was permitted to see many phases of the development of aircraft from Pearl Harbor to the present time. In an off-the-record session, the Army Air Force's plans and principal research projects for the immediate future were disclosed, particular attention being given to projected developments in jet and rocket-type aircraft and flying missiles.

In an address given at the closing session of the conference, Dr. Bush made a strong appeal for continuation of the research partnership between scientists, military men and industrialists which, he said, "gave us our edge" in World War II.

The decision by Ford to greatly expand its research and engineering work was made some time ago. During the past 2 yr the company has been adding quietly to its engineering personnel to the extent that the engineering staff has been tripled since August 1944. During this period the company has engaged hundreds of stylists, designers, electrical, metallurgical, chemical, test and cost engineers and has also added many other specialists to its staff. Many of these new men are prominent in the automotive field but it is worth noting that the Ford research staff also includes a healthy percentage of younger men who made reputations for themselves in various phases of research and development associated with the war effort.

PRESENT plans call for the construction of an administration and engineering building, styling building, dynamometer building, electrical and chemical laboratory and at least two other major structures. Work will be started on the dynamometer and styling buildings as soon as building conditions permit. In addition to the buildings already mentioned, an entire laboratory will be devoted to the study of human engineering.

The younger Ford's underlying philosophy concerning the importance of the human equation in making and buying things was expressed succinctly in a recent address to the Society of Automotive Engineers when he said:

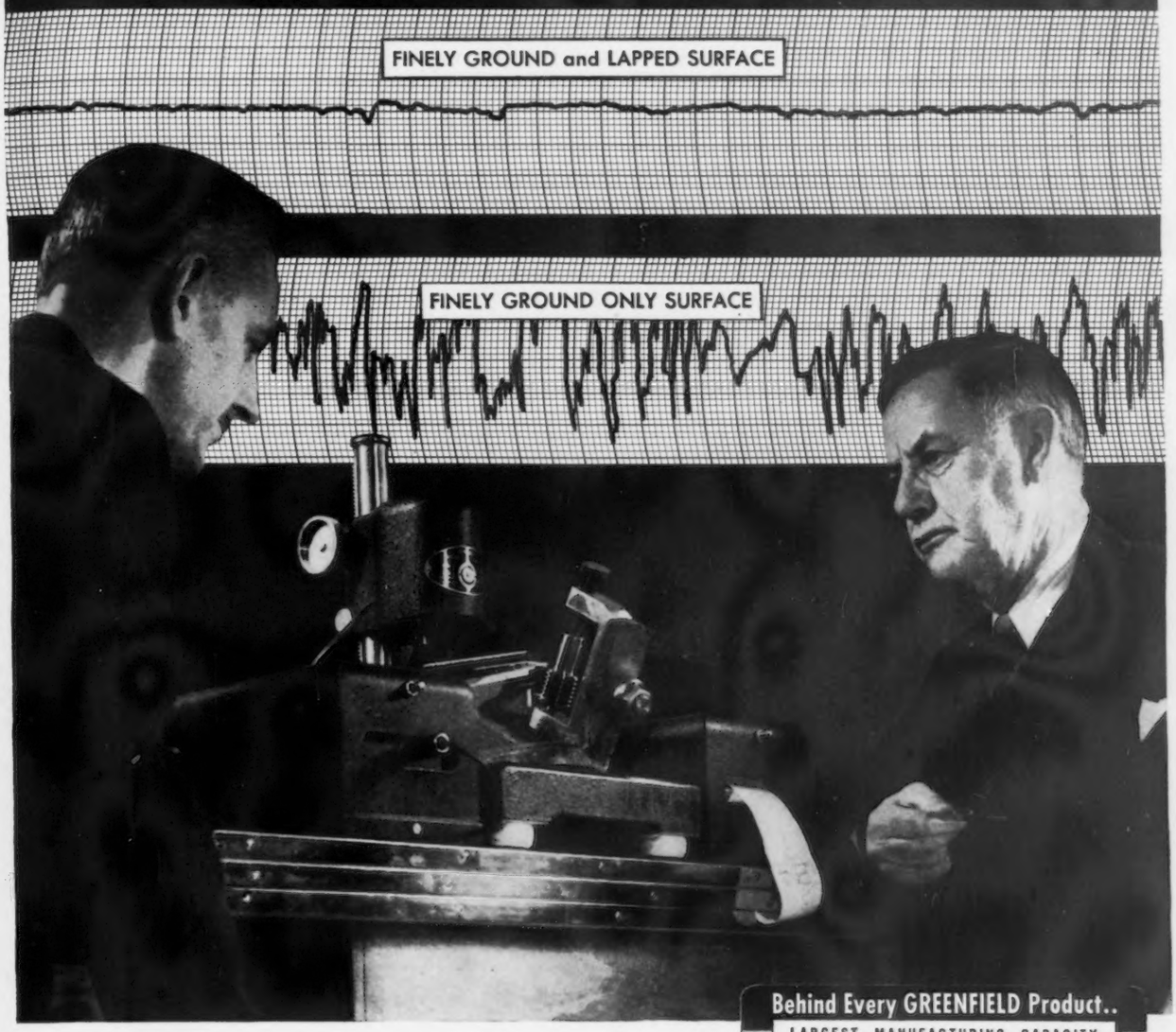
"There is a whole vast era in which we are only beginning to make significant progress — what we might call the field of human engineering. Machines alone do not give us mass production. Mass production is achieved by both machines *and* men. And while we have gone a very long way toward perfecting our mechanical operations we have not successfully written into our equations whatever complex factor represents man, the human element.

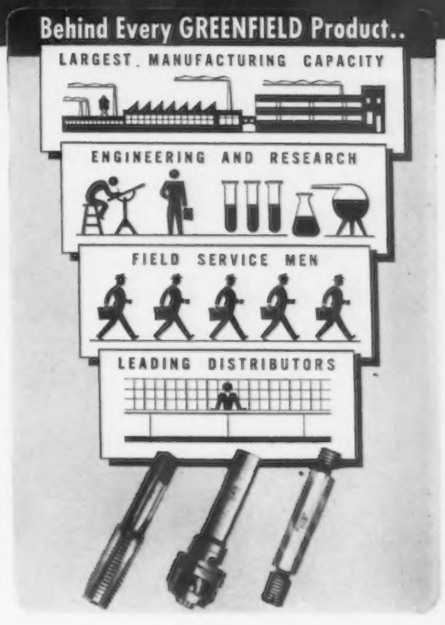
"I am suggesting, therefore, that we try to rewrite the equations to take into account the human factor. If we can solve the human relations in industrial production, I believe we can make as much progress toward lowering costs during the next 10 yr as we made during the past quarter century through the development of the machinery of mass production."

To many observers this latest statement of Ford policy seemed a far cry from the days when Ford was under constant attack, particularly by the growing unions, as be-

CARRIAGES TO CLIPPERS: *Fifty golden years of automotive development represented by the* 1896 *and the* 1946 *Packards. The only resemblance the youngster seems to have to its great-grandfather is in principle.*

Smoother Surfaces Give Longer Life





All "Greenfield" Gages have finely ground and lapped surfaces. To the casual eye, such surfaces look no different than if ground only. But the graph produced by the Surface Analyzing Machine illustrated above shows this difference clearly. To the gage user, this difference also becomes apparent—in terms of wear. A "Greenfield" Gage will give longer and more accurate service—and therefore better value—because of its finely ground ***and lapped*** surfaces.

It's "Greenfield's" attention to such unseen quality factors that give you ***more for your money*** when you use "Greenfield" Tools and "Greenfield" "Show-How" field service.

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ing inhuman and grossly lacking in consideration for the worker.

DETAILS of the Ford approach to the human engineering problem have not been disclosed. In the field of customer relations General Motors has for a number of years been carrying on a well-planned campaign, using large-scale distribution of questionnaires to car owners to determine customer likes and dislikes. Chrysler and Packard rely mostly on information supplied by dealers and salesmen to determine public buying trends.

It is generally agreed, however, that up to now Ford has been outstandingly successful in its labor and public relations activities and the company's determination to make an effort to reduce the handling of labor, purchasing and other problems in human relationships to a scientific, unemotional basis augurs well for the success of the Ford bid to regain its former supremacy in the automotive field.

Recent changes in the top management of General Motors are of considerable significance to Detroit since the move concentrates the operating direction of the corporation here under C. E. Wilson who is designated as chief executive officer of the company in place of the chairman of the board.

The latest GM move apparently recognizes the fact that while there may have been a time when the financial problems of GM were paramount, the many new problems recently injected into the picture, particularly in the field of labor relations, have assumed an importance that make it necessary to center responsibility for decisions at the operating hub of the company's activities.

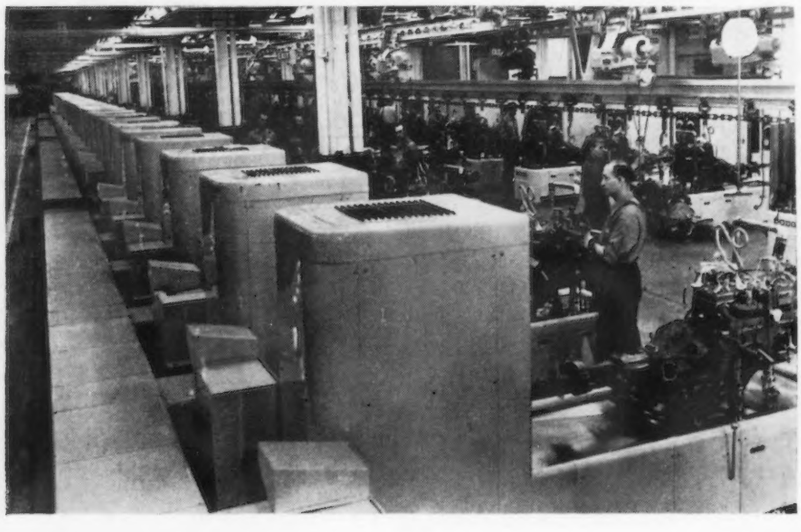
As one spokesman expressed it, "The corporation has become more operations-minded and less financial-minded. It has also recognized that GM probably requires somewhat different types of men from those who have been directing its activities for the past few years."

It is perhaps significant that three of the top men in GM management are primarily operations men—C. E. Wilson, O. E. Hunt and M. E. Coyle. Bradley, the fourth top executive officer, is primarily a financial man and will henceforth be located in New York.

Going back to the days when Knudsen took over the presidency, a good share of the operations work in GM was concentrated in New York. Now it appears that this authority plus a little more may be coming back to Detroit.

Explaining the move, GM said that the latest changes were made to strengthen the general staff to meet expanding responsibilities, concentrate the administration of the operational affairs of the corporation in Detroit and advance executives who have distinguished themselves during recent years. A fourth reason might have been added, namely—the mere job of keeping a big corporation running in the midst of labor difficulties, supply shortages and troublesome dealer problems undoubtedly requires a different operating setup than GM has had heretofore.

ELECTRICITY WITHOUT COAL: *This new dynamometer room is one of the showplaces of the Dodge main plant in Detroit. Engines on test generate* 510 *kw of electric power per hr which is fed into the electrical system, thereby saving an equivalent amount of fuel which would be needed to supply the same amount of electric energy.*



Ford Separates Sales From Manufacturing

Detroit

• • • **Under a new** plan of operations the Ford Motor Co. is completely separating its field sales organization for Ford, Mercury and Lincoln cars from the manufacturing and accounting ends of the business. Under the new setup, Ford branch superintendents will become plant managers having complete jurisdiction of all assembly plants operations, including employment, labor relations, plant protection, etc. The branch controllers will operate as a separate entity under the supervision of Dearborn management.

Henry Ford II, president, J. R. Davis, vice-president in charge of sales and advertising, and John S. Bugas, vice-president in charge of industrial relations, presented the new plan to its regional managers, plant superintendents, branch controllers and branch labor relations men in a series of meetings at Dearborn. Mr. Bugas and M. B. Lindquist, assistant director of labor relations, interpreted for the group the new company contract with the UAW-CIO.

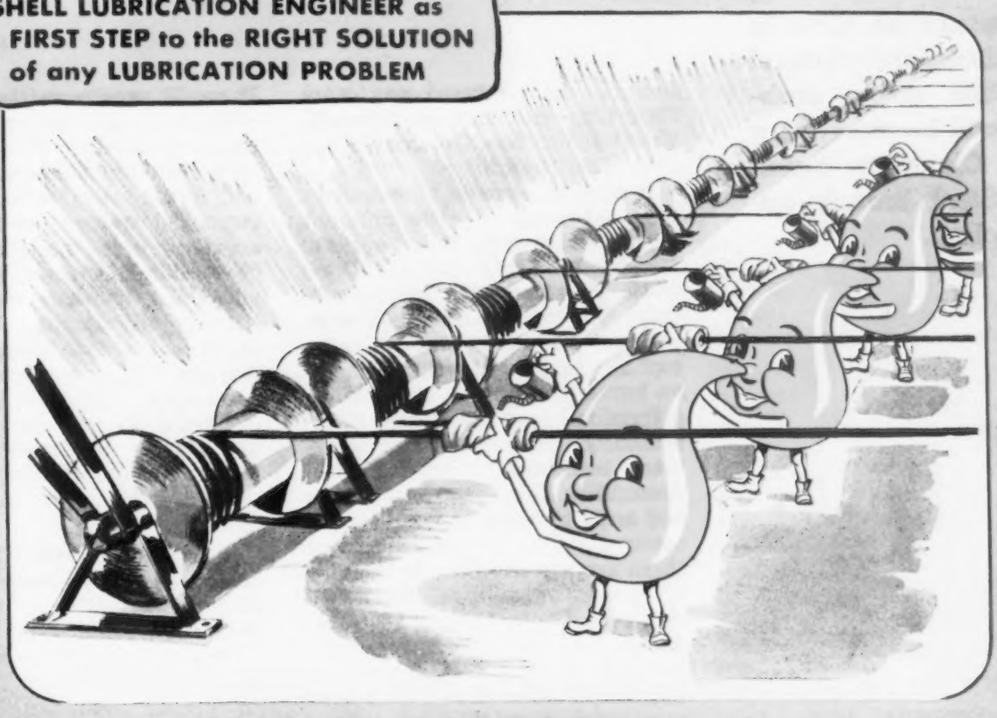
Captive Mines May Divert Coal to Lakes

Washington

• • • **Possibility that captive** mines may be called upon to divert some of their production to help fill stockpiles in areas normally built up by lake shipping, was hinted here this week as officials studied the question of premium payments for pig iron and other products. It was said that final decisions on the subsidies may be postponed until the problem of rebuilding these stockpiles is finally solved. Officials who declined to be quoted, say that obviously premium payments will have little effect on steel production.

Call the

SHELL LUBRICATION ENGINEER as the FIRST STEP to the RIGHT SOLUTION of any LUBRICATION PROBLEM



SHELL RUST PREVENTIVE ... ELIMINATES GUMMING

PROBLEM: Steel wire, drawn to proper size for use by wire rope makers, was coated at steel mill for protection during shipment and storage. Use of a rust preventive was necessary, but rope makers complained that it gummed and clogged their wire rope machines.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem he recommended a change to a Shell Ensis product. This gave complete protection, and the gumming problem disappeared. Moreover, Shell Ensis Fluid is a petroleum product... dissolves harmlessly when the permanent lubricant is added to rope strands.

* * *

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for a copy of Shell's 40-page booklet on Rust Prevention. Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York; or 100 Bush Street, San Francisco 6, California.

SHELL RUST PREVENTIVES

OILS . . . FLUIDS . . . COMPOUNDS

SHELL

Washington . . .

L. W. MOFFETT

• Pressure on CPA to reinstitute overall steel priorities setup probably will be unavailing . . . Chairman Small and Steel Branch oppose plan.

WASHINGTON—With strikes and slowdowns cutting steel production by more than 13,000,000 tons since the first of the year, increasing pressure is being brought to bear on CPA to reinstitute a broad steel allocation system. From the Capitol the CPA is sharply scolded at frequent intervals by Representative Patman's Select Committee on Small Business because of alleged refusal to provide priorities for small business. With settlement of the coal strike, the committee has put on increased heat demanding that CPA shed its "hands-off policy" concerning the distribution of steel. Even within CPA itself a report, backed by the Dept. of Agriculture and ODT, has been submitted to Chairman John D. Small proposing an 8-week plan of steel allocation. Agriculture wants more steel for farm equipment. ODT wants more steel for railroad equipment. Other sources want more steel for their particular purpose.

So a perfect circle leading nowhere is formed, each steel-hungry group, small, medium and large, suffering the same pangs from a diet of austerity. No doubt this is one, if not the principal, reason why Mr. Small continues strongly to oppose the plan. He has found no magic by which lost steel production can be recovered any more than time past can be returned. Sharing Mr. Small's view is the CPA Steel Branch.

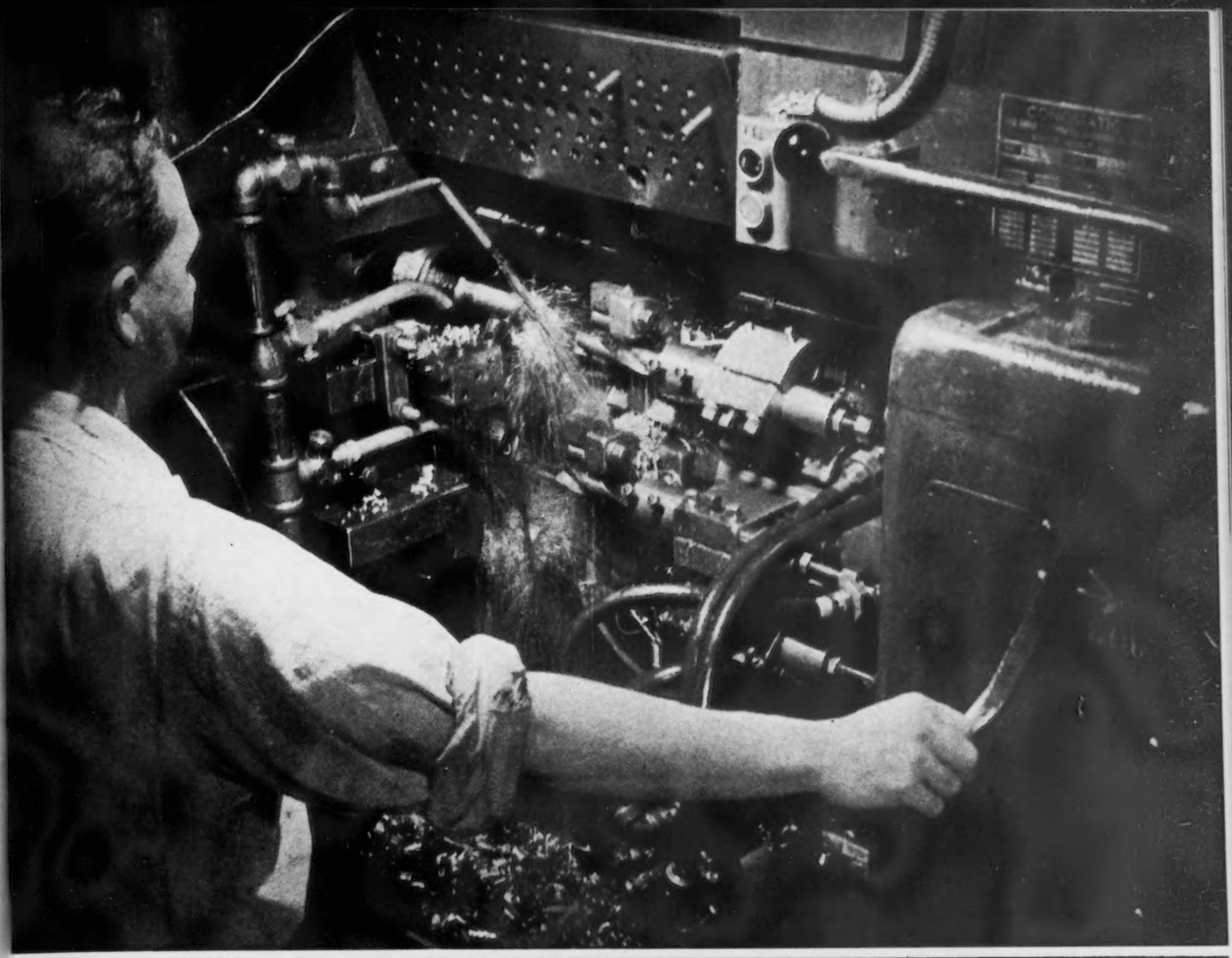
In several respects allocating in times of peace is quite different from allocating in times of war. Mr. Small is confronted with these distinctions and they are formidable. One big difference is that in times of peace it is impossible, except for such outstanding projects as housing, to arrive at a refined determination of the degree of essentiality. In times of war everything necessary to its successful prosecution is essential with no if's and and's to hedge about. Also in contrast with peacetime allocation there are repercussions in the way of charges of political favoritism or discrimination among economic groups. Mr. Patman, whose real interest in small business can be no greater than that of CPA or any other right-thinking source, charges that CPA has refused to direct the distribution of steel "even to the most urgent small plant hardship cases."

Actually CPA has done about all that it can do, in view of the supply situation, in asking mills to take care of their customers on an equitable basis. Also Mr. Small has resorted to use of priorities to aid small business and on more than one occasion has urged careful consideration of small business, which it deserves, but no more so than does big business, political folderol to the contrary notwithstanding. The claim of discrimination against what is loosely called small business has no justification. Evidently intended as a club to force action, the committee says that it is being urged to initiate legislation to provide priorities over the distribution of steel. There are two things to be said about this gesture. In the first place such legislation probably would get nothing more than political lip service in Congress. Secondly, even in the improbable event of its enactment, it would accomplish nothing.

SETTING up a priorities system is much more difficult than is indicated in the glib talk about it. It would require setting up, possibly on a somewhat smaller scale, the wartime CMP plan with complete control of industry. The plan had broad ramifications with a large and trained personnel from industry, which probably couldn't be recruited in peacetime, and to reestablish it would require from three to six months. It is to be hoped that by that time production, the key to the problem of shortages, will be rolling out in sufficient quantities to not only break the well known bottleneck but have such supplies in the bottle that all consumers can drink heartily and healthily.

In recent testimony before the Senate Judiciary Committee when he urged extension of the Second War Powers Act—Mr. Small repeated earlier declarations that it would be unwise to reinstitute an overall allocation system of steel. He conceded that occasional emergency actions will be required to avert serious dislocations in steel production or in other segments of the nation's economy. To support this statement he pointed to CPA's action in connection with tin plate for food preservation. Action also is being taken, he told the Committee, to assure sufficient steel for the production of railroad brake shoes, agricultural equipment and housing items.

"I can assure you," Mr. Small said, "that pressures for more control are examined carefully, and that we are extremely reluctant to take any step back into controls. We are now under pressure, for example, to allocate steel to a number of substantial uses. To do so, we believe, would lead inevitably and very quickly to general allocation of putting the government in the business and then deciding between industries; between vacuum cleaners and refrigerators; to deciding between companies within industries. That path seems to us to lead toward regimentation, which we oppose. It is a different matter to use controls to break bottlenecks which are holding up production at key points. Although we will have to help out in a few urgent and vitally essential cases on a plant-by-



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plant basis, I can assure you that we will do everything possible to avoid general allocation, and any controls we use will be as limited and as temporary as they can be."

HOW the limited priority system has been administered was explained by Mr. Small. He said that requests for priority assistance under PR-28, used for breaking reconversion bottlenecks, have increased rapidly in recent months. More than 30,000 applications for CC ratings were filed with CPA in the first six months of operation under PR-28. The value of materials rated during the same period totaled only about $75 million. The bulk of the ratings have been for capital equipment or for materials going directly into production; only a fraction have been for construction materials and for operating supplies. Apparel manufacturers making low-cost clothing have received by far the largest volume of CC ratings, but the construction industry has been receiving an increasing number of ratings, largely in connection with the Veterans' Emergency Housing Program.

Here is how, Mr. Small said, these bottleneck-breaking priorities work:

"Manufacturers of machinery for making bricks and concrete blocks were helped to obtain electric motors without which their machines could not have been completed. This assistance prevented what might have been a big loss of production in these building materials.

"PR-28 also has been used to help lumber producers. Equipment which they needed for felling logs, processing timber, and getting lumber to loading points was made available under this priority, and has helped prevent an even more critical lumber shortage than exists today.

"Small manufacturers of fractional horsepower electric motors have been given assistance in obtaining copper wire and bearings without which they could not continue operating their plants. Manufacturers of both heavy and light farm equipment were helped to overcome bottlenecks in such materials as chains, bearings and tires.

"Thousands of veterans of this last World War have been given assistance in establishing their own small businesses. They have been helped in getting capital equipment, such as concrete block making machinery, alfalfa dryers, photographic equipment and printing presses, and in other instances they have been assisted in obtaining initial inventories of production materials."

•

Limited Allocation System Inaugurated For Vital Products

• • • **A three point** plan for limited allocation of steel products was announced by CPA this week. Allocations for certain farm machinery items and some products needed for the housing program, for products sponsored by the Army, Navy, Maritime Commission, Veterans Administration, and the Federal Public Housing Authority, and for replenishment of warehouse stocks are covered in a direction to the steel preference order, M-21. The program covers the third quarter only and will require about 550,000 tons, says CPA.

CPA Administrator John Small says the action was taken because of the breakdown of the voluntary quota system under which steel mills planned to allocate 5,000,000 ton production monthly. The breakdown was ascribed to the coal and steel strikes.

Manufacturers of farm machinery and housing products on the list issued by CPA are permitted to "self-certify" orders for steel needed for their production of certain specified items. These "self-certified" orders must be produced in preference to all others for the same product classification. They must be treated as rated orders.

Orders for products sponsored by the agencies listed above must also be treated as preferential orders.

CPA says that if manufacturers wish to place the orders for July rolling they must be in the hands of the mills by June 15.

Certified orders received by warehouses may be extended to the mills. CPA says this action was taken to assure small business of adequate supplies of steel.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

SAY, THEM OLD GEARS HAS BEEN AROUND HERE A LONG TIME! OL' AL HUBBARD WAS ON TH' GEAR CUTTERS THEN-- THAT WAS ABOUT 1914!
THE OL' BOY LOOKS LIKE HE THINKS TH' BULL IS A LOW SORT OF PERSON, NOT NOTICIN' HIS BEAUTIFUL FLOWERS!
MAYBE THAT'S WHY HE'S A WATCHMAN-- TOO MUCH FLITTIN' AMONG FLOWERS 'STID O' SWEATIN' AMONG GEARS!
6-14
J.R.WILLIAMS
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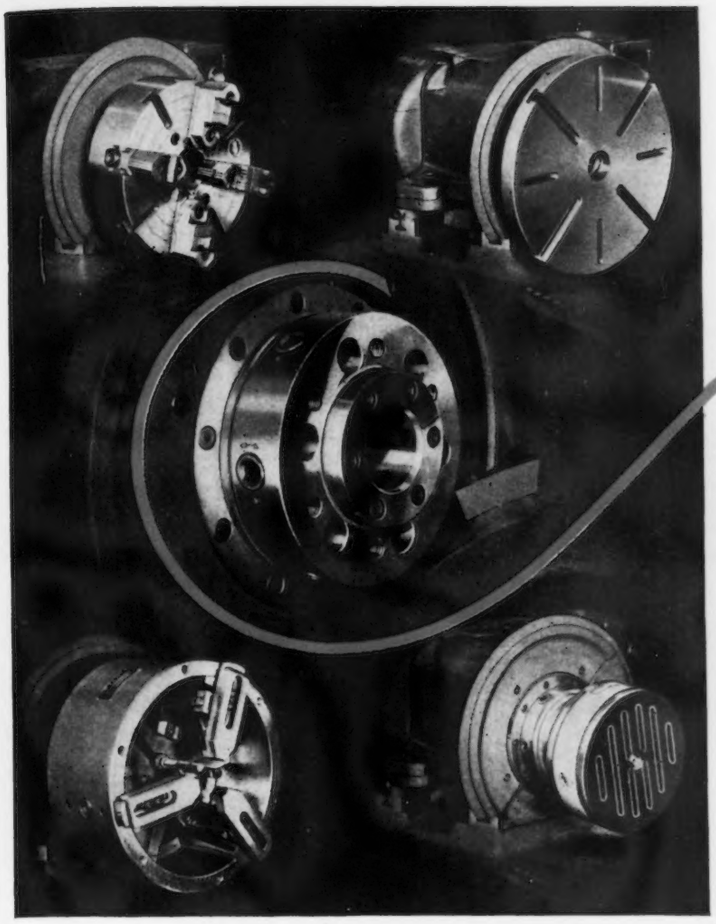

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West Coast . . .

ROBERT T. REINHARDT

• Columbia Steel Co. proceeding with new sheet mill facilities at Pittsburg, Calif., regardless of outcome of Geneva bid award . . . Western industrial activity promises upswing.

SAN FRANCISCO—Regardless of whether Columbia Steel Co. becomes the operator of the Geneva steel plant, through award of this property to the U. S. Steel Corp., the Pacific Coast is assured of an increased supply of steel sheets early in 1947.

The previously announced expansion of Columbia Steel Co. at Pittsburg, Calif., is well underway and scheduled for completion in the first quarter of next year according to W. A. Ross, president. Equipment for the $25 million program is on order and includes the following: 56 in., five-stand, four-high United cold reduction mill; two, two-stand United tinplate tempering mills; one single-stand United sheet tempering mill; Wean Engineering Co., Inc., continuous pickling line; two Wean continuous electrolytic tinning lines; three Mesta tinplate shearing lines; Wean tinplate side trimming and recoiling line; Swindell-Dressler Co. tinplate and sheet coil annealing equipment; sheet shearing and processing equipment for drum stock; hot dip tinning unit and auxiliary equipment; sheet galvanizing line; and utility cranes from the Alliance Machine Co.

Construction problems being what they are today, Mr. Ross admittedly is optimistic in predicting production in the new mill early in 1947, but stated that unless additional obstacles are encountered he believes that the old sheet producing unit can be shut down about the first of the year and that within three months the new mills can be finishing hot-rolled sheets brought in from Birmingham. Electric motors for mill operation are critical items at present but it is hoped they will be available before needed.

The present sheet mill at Pittsburg has a rated capacity of 83,300 tons per year which is rolled from ingots produced there. With the new setup no hot-rolled sheets will be turned out, but approximately 500,000 tons of sheet and tinplate will be cold rolled. Present estimates indicate that approximately 200,000 tons will go into tinplate and the remainder into cold-rolled sheets.

Basic openhearth capacity at Pittsburg is 358,000 tons per year and release of this production from sheet products will provide material for increased expansion of bar, wire rope and wire products. Demand for these products far exceeds production facilities at the present time. Even operating at capacity 24 hr a day, Columbia's wire mill is unable to meet the demand for bale ties which are extremely short on the Coast. It is reported that present production was without profit under the old price ceiling but was continued in view of the threatened loss of a large proportion of the West's hay crop.

The new cold reduction mill is said to be the most modern in the country and will furnish sheet and tinplate speeding through its rolls at approximately 45 mph.

If the bid of U. S. Steel Corp. for Geneva is approved, the plant will be operated by Columbia Steel Co. and the hot strip for the new Pittsburg mill will come from the Utah plant. Otherwise, Birmingham will be the source of supply.

* * *

Joshua Hendy Iron Works at Sunnyvale, Calif., has purchased from the War Assets Administration the portion of the plant this company operated for the government during the war at a price of $1,103,295, it is reported. This unit produced large cast cylinders and engine bases and it is anticipated it will now be utilized for production of diesel engines, steam turbines and water control equipment. The management reports that approximately 2500 persons will be employed by October of this year.

* * *

CHARLES S. KNIGHT, one of the sponsors of the Iron, Steel & Allied Industries, has announced his retirement as director of the industrial dept. of the California State Chamber of Commerce after 23 yr of service with that organization.

For the 18 yr preceding the entrance of the United States into the recent war, the Iron, Steel & Allied Industries conducted an annual conference at Del Monte. These conferences have been credited with helping to develop leadership and concerted action in dealing with the major issues affecting the growth of heavy industry in California. Mr. Knight is responsible for having organized the industrial dept. of the local Chamber and introducing programs to develop the mining, construction and other industrial developments which would utilize the raw materials and natural resources of this state for the purpose of providing employment, greater purchasing power and expansion of industrial payrolls. When Mr. Knight took his position with the Chamber in 1923, industry in California was beginning to show signs of progress and to give evidence of its scope which culminated in such a remarkable record during the recent world war. According to various estimates and forecasts, California manufacturing has doubled since 1939.

Mr. Knight received his bachelor of science degree at the University of Wisconsin after which he spent 2 yr at Kansas State College, Manhattan, Kan., and 11 yr at the University of Nevada where he gained organization experience as dean of the college of agriculture and as director of agricultural extension. For 3 yr he was president and managing director of the Reno Chamber of Commerce before joining the San Francisco Chamber.

Mr. Knight reported on retire-

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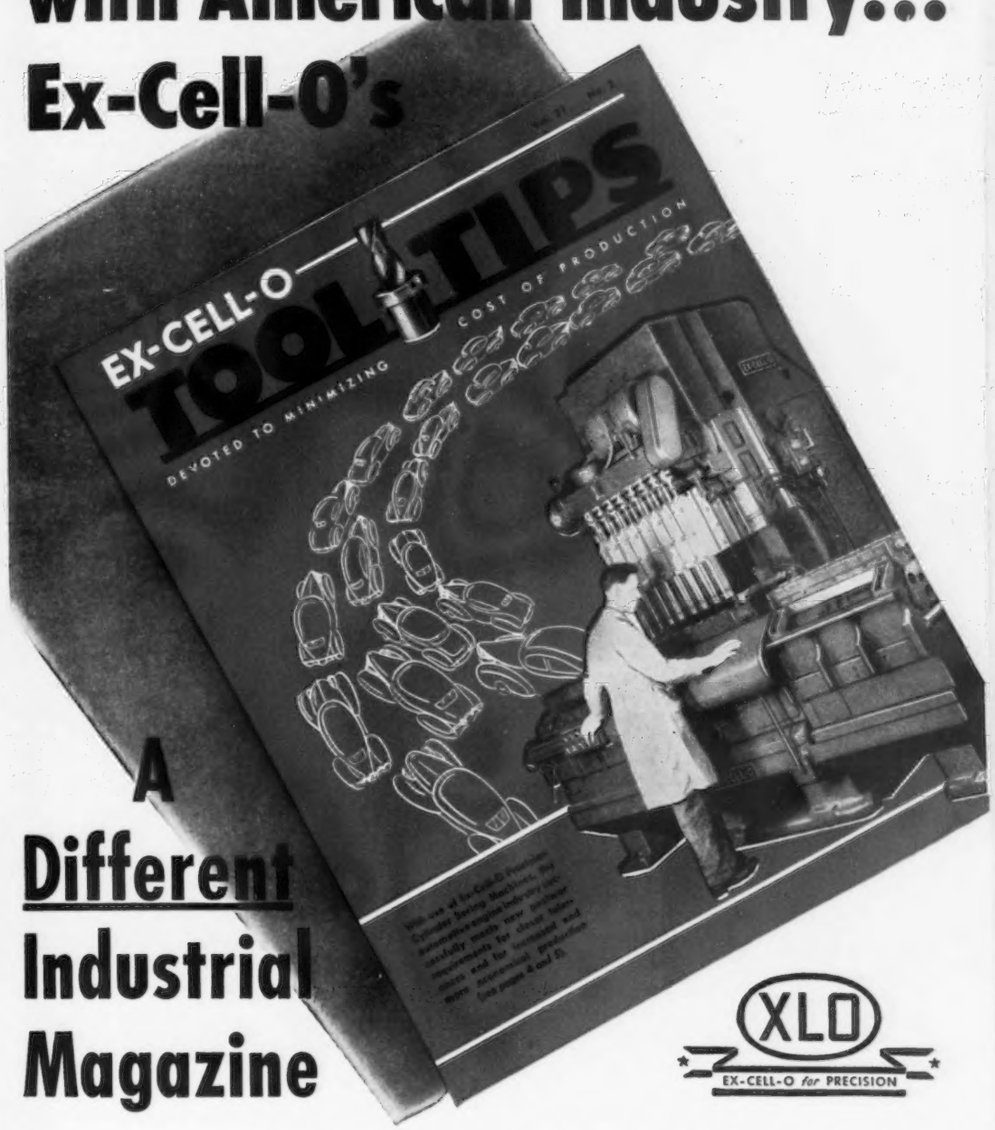

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ment that every effort is being made by members of the Iron, Steel & Allied Industries to renew the annual conferences which were extremely popular in prewar years. It is understood that the Del Monte facilities will probably remain in the hands of the U. S. Navy and will be unavailable.

* * *

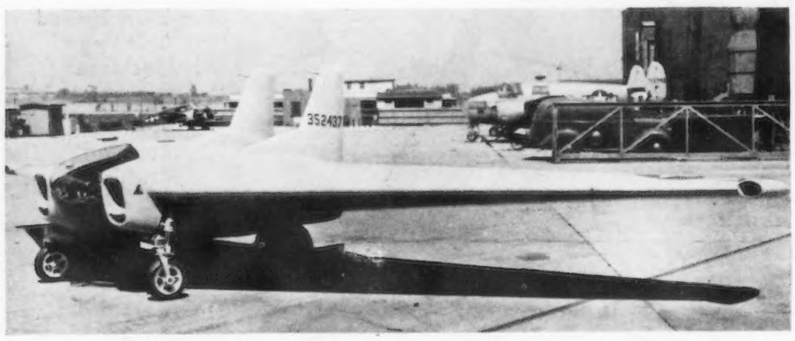
The West faces a very prosperous future with manufacturers producing 40 pct more by 1947 than they did in 1940 and with employment up 33 pct over the 1940 figures, according to a survey—titled "Marketing in the West" edited by Dr. Nathanael H. Engle of the University of Washington, and just released.

According to the San Francisco Chamber of Commerce the trend in employment and payrolls is definitely upward in this area reflecting the settlement of labor disputes which have unbalanced local economy for many months. In April employment increased 27.7 pct and payrolls rose 35.5 pct over March levels in five Bay area counties. The number of wage earners increased from 83,000 in March to 106,300 in April with average weekly earnings amounting to $51.36 which compares to $48.27 in March.

LOS ANGELES—Taking a leaf from aircraft production techniques, an assembly line has been set up for the manufacture of small, aluminum overnight pleasure trailers by the Kit Mfg. Co. at Norwalk, Calif.

Instead of being constructed of channel iron, the frame is welded steel tubing and has a reported safety factor of 1500 lb dead weight. Another unusual feature of the trailer is the use of individual torque bar suspension instead of conventional shock absorbers.

The exterior is entirely aluminum, bonded to plywood with a special bonding agent. The aluminum is aircraft quality Pureclad surface coated to allay corrosion. The galley, roof and turtleback are subassembled and fitted into place on the main structure as it moves along the production line.



FLAT ON HIS FACE: *This weird fighter called The Flying Ram is flown in excess of* 500 *mph by a pilot who lies prone in the cockpit. The XP-79 is jet propelled with the span of* 38 *ft by only* 14 *ft long. Ducts on the wingtips aid in the operation of split flap rudders.*

Production is now at the rate of 10 units a day and it is expected that this will be boosted to 25 a day by August. Present schedules contemplate 1000 units by Oct. 1 and if materials are available projected production for next year is between 3500 and 4000 units.

C. W. Worman and Dan Pocapalia, co-owners of Kit Mfg. Co., are former production executives at Consolidated Vultee Aircraft Corp.'s Downey plant.

A profit sharing plan has been established whereby employees receive prorated bonuses at the rate of $5 per trailer.

* * *

INTELLIGENT industrial planning to safeguard the country's future air strength was stressed by Brig. Gen. E. W. Rawlings, Chief of Procurement Div. Headquarters, Air Materiel Command, before the annual aviation meeting of the ASME held at Los Angeles. General Rawlings urged an annual replacement of approximately 25 pct of our total aircraft inventory. Supporting his statement, he said, "It is practically impossible to stockpile airplanes as a fairly high physical depreciation rate is combined with exceedingly high obsolescence factor."

J. Carlton Ward, Jr., president, Fairchild Engine & Airplane Corp., stated that it is reasonable to conclude that should a future war emergency arise, Atlantic and Pacific barriers would probably never again provide us with a span of years in which to put our national production machine to work. "Six years from threat of war to peak production would never do should there be a World War III," he stated.

SALT LAKE CITY—At long last, striking mine and smelter workers and operators are discussing wages in an effort to settle the walkout which has kept Utah Copper Co., U. S. Smelting, Refining & Mining Co. and American Smelting & Refining Co. closed since last Jan. 21. Negotiators of the CIO International Union of Mine, Mill & Smelter Workers have been meeting with Utah Copper Co. officials. Robert C. Williams of San Francisco, the Labor Dept.'s special conciliator for the nonferrous metals industry, is acting as mediator. One issue other than wages which may prolong the strike is union security. The subject hasn't been brought out into the open yet, but it is one of the high hurdles in the background.

SEATTLE—Another steel sheet mill on the West Coast with 50,000 to 60,000 tons annual capacity has passed beyond the talking stage with the announcement that the Seidelhuber Iron & Bronze Works, 1421 Dearborn St., Seattle, is having designed and is working on the $5,000,000 financing of such a plant.

Freyn Engineering Co. of Chicago will work on the design, installation and purchases and Engineering Associates, Seattle, will fabricate required structures. Tentative plans call for a steel and reinforced main structure 200 x 1200 ft with five oil-fired heating furnaces. The mill building together with an office structure and warehouse are to cost $1,000,000. It is planned to roll and process black, galvanized, pickled and corrugated sheets and to produce concrete and merchant bars and light shapes. Plans call for the purchase of billets from outside sources.

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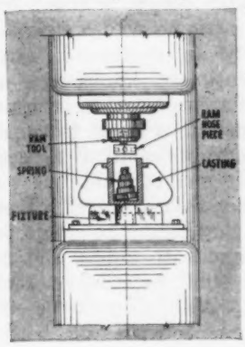

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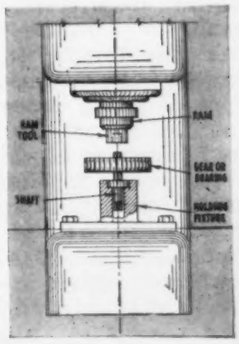

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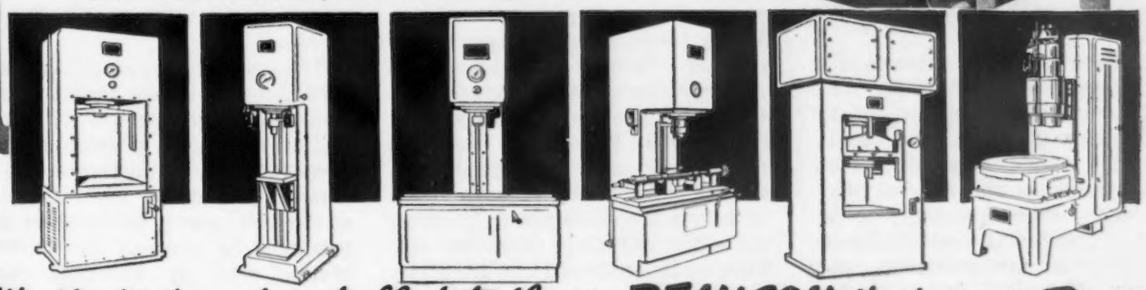

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European Letter . . . JACK R. HIGHT

• British steel nationalization debate reveals labor fear of political power in private hands . . . Sir Andrew Duncan defends federation plan.

LONDON—Outcome of a 2-day debate in the House of Commons on the government's decision to nationalize the steel industry was only a slight increase in the total of available information on the subject. Iron ore mining, pig iron production, and steel ingot production were disclosed to be definitely within the scope of the plans, but the future of finishing steel plants was left in doubt.

Principal figures in the debate were Sir Andrew Duncan, independent chairman of the British Iron & Steel Federation and member of the House for the city of London; John Wilmot, Minister of Supply, who opened the debate for the socialist government; Hugh Dalton, Chancellor of the Exchequer, who discussed the financial details of the plan; Oliver Lyttelton, wartime Minister of Supply, who opened the debate for the conservatives; and Herbert Morrison, Leader of the House, who concluded for the government.

The debate was the outcome of a demand by the opposition for time for debate on the announcement, by the Minister of Supply, in April, that the public ownership step promised before the general election last year was actually to be taken. There was some indignation at the announcement, and Winston Churchill in particular protested his horror at the nature of the statement (THE IRON AGE, Apr. 25, p. 88), but the interest seemed to have been perfunctory. When the time came for the opening guns of the debate, Mr. Churchill was not present in the house, and the benches reserved for the conservatives were almost deserted when Sir Andrew Duncan got underway on what the London press called the most informative speech against the proposal.

Although Sir Andrew's words were the strong ones that might be expected from a man in his position on such an occasion, his tone reflected the inner knowledge that he would not be able to sway the opinion of the Labor party. Voting on a motion by the government for House approval of the nationalization policy for steel, the outcome was indeed foregone.

Greatest addition of information on the government's plans came from Minister Wilmot when he added details on the sections of the industry that are to be nationalized, although he left adequate loopholes to cover any future ideas that might occur. His statement as to the scope of public ownership in iron and steel was as follows:

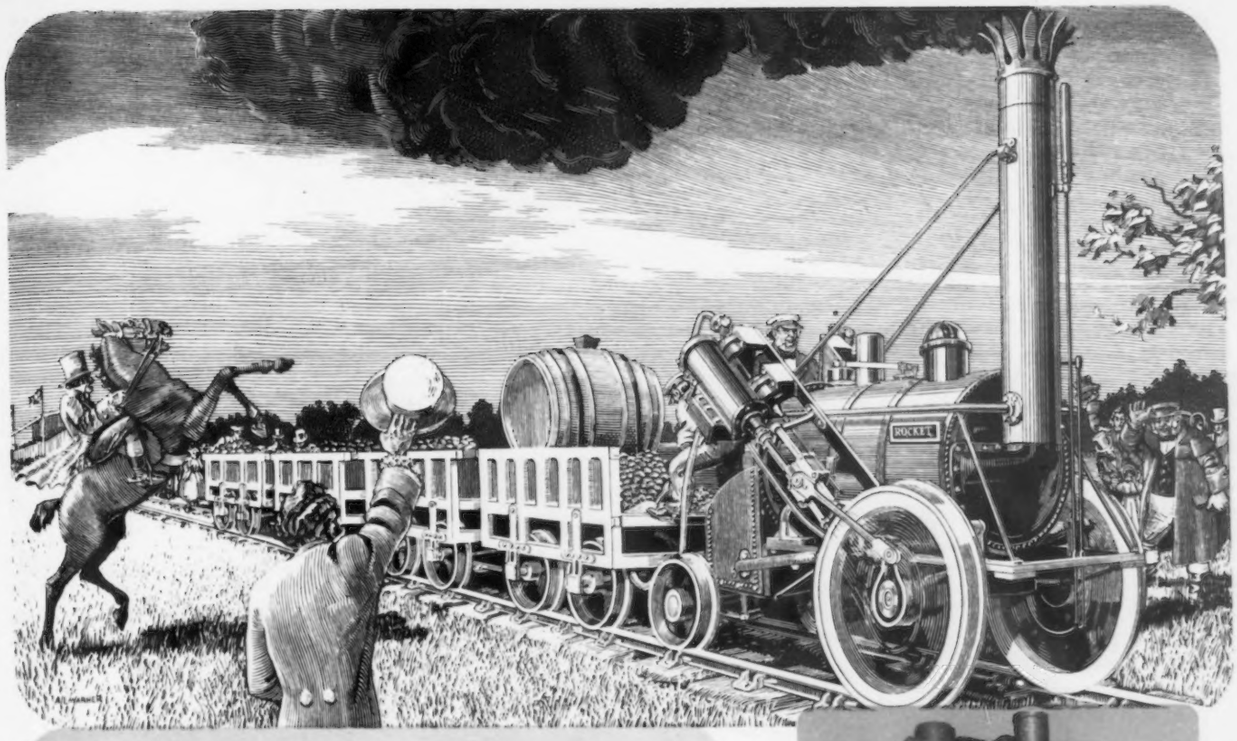
"Now I propose to tell the House which sections it is proposed should be brought into public ownership, subject, of course, to the possibility of excluding some special individual plants where conditions are exceptional. We think it right to start with the iron ore and with those coke ovens which were omitted from the coal plan as being associated with steel works. We should also take over the manufacture of pig iron and the manufacture of steel ingots from pig iron or scrap. We must include the primary or heavy rolling sections of the industry, since steel smelting and primary rolling are essentially one industry operating a continuous process. Beyond this there are various other finishing operations, some of which are so closely integrated with the actual iron and steelmaking as to be virtually one process. We intend in such cases to include the whole plant. In other cases the finishing processes are more easily separated and are often carried on in separate or independent works. There we intend to review the field, section by section and firm by firm, in consultation with the industry, before deciding on the exact boundary in each particular case.

"SURELY the House and the industry will agree that this is the only fair and sensible course. It is really suggested that the government should make up its mind on these intricate details of particular plants without consulting the people whose livelihood or property is concerned, and who have intimate knowledge of the particular problems in each case? I have had it in mind to consult on these purely technical aspects and not only management but workers and their unions as well. I want to insure that after the whole job has been done both public and private sectors shall be efficient and successful. We shall seek the opinions of the men on the job, both managers and workers."

The response to this delineation by the government was that it left a wide ground for wonder in the industry, and that the indecision while the industry was being examined "section by section and firm by firm" would be detrimental to modernization plans.

The local press called attention to what the Minister left unsaid as a part of his policy of acquiring only those finishing operations that are integrated with the more basic steps. The apparent logical sequence would be that for the nonintegrated steel-finisher there would be the choice of competing with a huge integrated government industry or going out of business. Certainly it would operate only on the whim of the government operation, and would be subject to possible government action either for operating successfully or failing to do so.

The forensic guns of the conservatives as to the extent of nationalization appeared to have been spiked when Mr. Wilmot did not propose to draw a horizontal line of demarcation at the ingot stage or at the billet stage, as the press had predicted in advance. He covered himself well by assuming carte blanche responsibility for these stages and any more that he might



JUST ANOTHER WAY TO HAUL A WAGON

To the people of George Stephenson's time, the entire problem of engineering a steam locomotive was wasted effort. Even if solved, it would be just another way to haul a wagon, and the horse was doing that already.

When Stephenson finally produced a practical machine, it was immediately apparent that the horse could not compete. Good engineering had provided not just "another way," but a BETTER WAY.

George Stephenson demonstrated with his locomotive a point so commonplace today that it is often overlooked . . . that a better way of doing something often provides indirectly, benefits that are more important than the immediate application itself. What the locomotive, for example, made possible in terms of better living for all would be almost impossible to calculate.

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Why Forge with a Press?

Forging operations performed on a press represent a relatively new metal-working technique. Experience is proving it is not just another way, but a better way. Forged parts are quickly produced to uniform dimensions at low cost. Illustrated is a 200-ton Clearing Forging Press with a work capacity of 25 finished parts per minute. The operator is required only for loading and unloading.

CLEARING MECHANICAL AND HYDRAULIC PRESSES

CMC CLEARING

select, as well as making a proper loophole for excluding any firm at any stage that he might choose "as an exception."

As was expected, the Minister of Supply accepted the basic outlines of the industrial modernization plan presented by the British Iron & Steel Federation (THE IRON AGE, May 23, 1946, p. 114). Study of the phraseology of the acceptance indicates that here again Mr. Wilmot heaped himself with a glory of "outs" to cover any contingencies.

"I say at once that the government accepts much in these reports as a sound basis for industrial reconstruction. Of course, we cannot be bound by every detail, but we particularly welcome the important proposals for new projects in the development areas, which will greatly enhance the efficiency and improve the balance of the whole of our national economic life."

IF the steel industry hoped that as a result of the debate it might get more information as to why the nationalization was reaffirmed it was disappointed. Harking back to the formation of the British Iron & Steel Federation in 1934, the Minister stated that the steel industry here abandoned the methods of competition at that time. He described the growth of federation control as characterized by divided loyalties between shareholders and the trade association, and declared that this divorcement of control from ownership must stop. It will be recalled that he used the same argument to dismiss the idea of a government steel board superimposed upon the existing structure in favor of public ownership.

To further support the decision, Mr. Wilmot brought forth the comparatively new argument that the federation is not strong enough to bring about the improvement plan which it has drawn up. In support of this contention he referred to statements reportedly made by certain of the companies most drastically affected by the plan. There was a flurry of debate between the Minister and Sir Andrew Duncan on the second day of the debate as to whether the small companies were actually in open revolt at the prospect of the overhauling of their plants.

The companies involved in this sally were South Durham Steel & Iron Co., Cargo Fleet Iron Co., and the Skinningrove Iron Co. Object of particular interest was the objection of the chairman of the last firm to the obscure statement in the federation plan that in the long run there could presently be seen no future for this plant.

In contrast to this suggestion of inherent weakness in the structure of the trade association, the Minister of Supply went on to point out that suggestions of the trade association imply a retention of tariff protection and of central price-fixing powers.

He added, "The federation further assumes that it itself shall exercise these powers under some form of government supervision. This surely is monopoly with a vengeance, and I suggest that neither the government nor this House is likely to approve it."

Reports Construction Of British Homes In April Gains Momentum

London

• • • **In Great Britain** 8606 permanent and 26,199 temporary houses had been completed at the end of April, according to the fourth of the official British monthly housing progress reports. The following table gives totals for all permanent and temporary houses erected by local authority and private enterprise (Table I).

In addition, 75,343 permanent houses are projected but not yet begun. Of these 56,309 are on local authority tenders approved and 19,034 under licenses issued to private builders. The total number of houses of all types either built, building or projected for Great Britain as a whole is 214,100, compared with 178,146 at the end of March. This total does not include 3272 temporary huts completed, or the balance of 120,000 temporary houses projected.

During the period from Mar. 31, 1945, until the end of April this year accommodation has been provided in Great Britain, by construction of new houses, by repair of damaged unoccupied houses, and by requisitioning and conversion of existing houses, for 155,916 families. This shows an increase of 14,690 on the total for the end of March.

The following table gives the division of permanent houses between local authorities and private enterprise: (Table II).

The total labor force employed on the construction or repair of houses in Great Britain rose during April from 483,800 to 489,500. There were 84,000 men engaged in building permanent houses compared with 71,500 at the end of March, and 38,900 in erecting temporary houses compared with 36,100.

TABLE I

Houses completed:	Total at Apr. 30	Increase on Mar. 31	March increase on February
(Permanent 8606; Temporary 26,199)*....	34,805	7,553	6,116
Houses under Construction:			
(Permanent 82,777; Temporary 21,175)....	103,952	19,695	19,437
Total Houses Built or Building:			
(Permanent 91,383; Temporary 47,374)....	138,757	27,248	25,553

* Not including 3272 temporary huts.

TABLE II

	Houses completed at Apr. 30	Increase on Mar. 31	Houses under construction at Apr. 30	Increase on Mar. 31
Local Authority	3,305	774	52,785	11,381
Private Enterprise	4,086	1,338	24,991	4,030
War Destroyed Houses Rebuilt:				
Local Authorities	745	257	2,598	1,467
Private Builders	470	167	2,403	
Total Permanent Houses	8,606	2,536	82,777	16,878

PHOTO COURTESY OF THE BETTMAN ARCHIVE

FROM A METAL MAKER'S "FAMILY ALBUM"

WHEN HAMMERS WORKED LIKE THIS—

Standard's Present Plant Had a Double-Acting "Ten-Tonner"

This scene shows advanced hammer-forging practice in 1867 . . . and the plant of Standard Steel was never one to lag behind. A modern, double-acting, ten-ton steam hammer with wrought iron frame, purchased in England, was installed in a new stone building. This building is still standing . . . and descendents of some of the men who worked that new hammer are valued employes at Standard today.

Like the oak from the acorn, great things have grown from this beginning. Now Standard's forge shop has fourteen hammers, with capacities from 3500 to 12,000 pounds, and six steam hydraulic presses with from 600 to 2500 tons capacity. Locomotive or marine forgings, shafts, rolls, ordinance forgings or any forging of a weight not exceeding 25 tons which can be made under press or hammer, can be efficiently produced.

When you need forgings or castings, you can simplify the job of getting them very easily. Just "Standardize on Standard."

BALDWIN

FORGINGS AND CASTINGS

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Norfolk.

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS

PERSONALS

WALTER P. BERG, general manager, Machinery Div., Dravo Corp.

• **Walter P. Berg** has been appointed general manager of the Machinery Div. of the Dravo Corp., Pittsburgh. Mr. Berg assumes the duties of W. K. Fitch, who recently became Dravo board chairman. Until 1938, Mr. Berg was active in engineering and sales work with the Machinery Div. of the corporation and since that time he had been in charge of the power dept. of Dravo Corp.'s Machinery Div.

• **Robert A. Rankin** has been named sales manager of the Diesel Engine Div., Chicago Pneumatic Tool Co., New York. Mr. Rankin, formerly assistant manager of Engine Div., replaces **H. W. Buker,** head of Diesel Engine sales for last 20 yr, who has retired.

• **Milton S. Lennard,** recently elected vice-president of the National Magnesium Corp. of Elkton, Md., and New York City, has been named general manager of the company.

• **Nicholas Dreystadt** has been appointed general manager of the Chevrolet Motor Div. of General Motors Corp., New York, and **John F. Gordon** has been appointed to succeed Mr. Dreystadt as general manager of the Cadillac Motor Car Div. Mr. Dreystadt succeeds **M. E. Coyle,** who has been elected an executive vice-president of General Motors to devote his efforts to the general administration of the corporation.

o o o

• **Harry S. Anderson** has been appointed assistant to the vice-president in charge of operations for Youngstown Sheet & Tube Co., Youngstown, Ohio, succeeding **Charles E. Oestman,** who has retired after 39 yr in the steel business. Mr. Anderson, formerly manager of the claim dept., is succeeded by **Herbert H. Hottel,** assistant manager of the department.

• **Alfred H. Roth** has been appointed advertising and sales promotion manager of Towmotor Corp., Cleveland, and **Edward Southworth** has been named district sales representative for northwestern Ohio, with headquarters in Toledo. Mr. Roth, prior to his war service, was associated with Talon, Inc., for many years as assistant to the vice-president in charge of sales and advertising. Mr. Southworth has been associated with Towmotor since 1936.

• **Henry M. Chance, II,** has been elected to the position of assistant to the president of United Engineers & Constructors, Inc., of Philadelphia. From 1934 to 1936, Mr. Chance was junior metallurgist with American Smelting Co., and since 1936 he has been associated with United Engineers & Constructors, Inc.

• **Charles F. Munroe** has been promoted by Hewitt Rubber Div. of Hewitt-Robins, Inc., to manager of railroad sales, eastern division, with headquarters in New York City. Mr. Munroe served in the purchasing dept. of New York Central Railroad Co. from 1916 until 1941, when he joined the OPA in Washington as chief of the transportation equipment section. He joined Hewitt's sales organization, eastern division, in 1945. **Andrew Thompson** has been made manager of transportation seating, Restfoam Div. Mr. Thompson has been with Hewitt since 1936, having served in the sales dept. at Buffalo and as manager of New England sales.

• **J. S. Bridges,** resident manager of the North Birmingham, Ala. plant of the U. S. Pipe & Foundry Co., has been appointed resident manager of the company's Bessemer, Ala. plant. Mr. Bridges heads both operations following the retirement of **Gordon Jones,** resident manager of the Bessemer plant since 1919. Mr. Jones had been associated with U. S. Pipe since 1899.

• **W. H. Waters** has been appointed assistant vice-president of American Car & Foundry Export Co., New York. He had been connected since 1940 with the ACF purchasing dept. as liaison man between the company and the U. S. Ordnance Dept.

• **C. R. Standen** has been appointed advertising manager of the Ladish Drop Forge Co. of Cudahy, Wis. Prior to the war, Mr. Standen was associated with the RCA Victor Div. of Radio Corp. of America in Camden, N. J. and joins the Ladish organization after 3 yr Army service.

• **Grant A. Grader** and **Philip J. Lekniskey** have been elected to the board of directors of Bedford Tool & Forge Co., Cleveland.

• **Arthur G. Buterbaugh** has been appointed sales manager in the Detroit district for the Washington Steel Corp., Washington, Pa. He joined the Sales Div. of the corporation on May 1.

ARTHUR G. BUTERBAUGH, sales manager, Washington Steel Corp.

• **C. J. Gaspar** has been appointed to the position of sales manager, manufacturers wire for the Nichols Wire & Steel Co., Davenport, Iowa. Mr. Gaspar was employed by the company in 1945, after his release from the Navy. Prior to entering the service, he had been assistant sales manager of the stainless steel dept. of Pittsburgh Steel Co. **F. P. Leahey** has been made manager of the wire mill at Battle Creek, Mich. Prior to coming to the company, Mr. Leahey worked for the Spencer Wire Co. at West Brookfield, Mass., and came to them from the American Steel & Wire Co.

• **Emil H. Lang** has been elected president of the Erie Forge Co. and the Erie Forge & Steel Co., Erie, Pa. **G. W. J. Stout** has been elected vice-president for both companies; **Craig Devine,** treasurer; and **F. E. Wuenschel,** secretary.

• **Oliver M. Hepler,** assistant comptroller at Richmond, Va., has been elected comptroller of the Chesapeake & Ohio Railway, with headquarters at Cleveland, succeeding **J. Fred Andrews** who assumes the duties of auditor for the company at Richmond.

• **Parker M. Robinson,** formerly associated with Westinghouse Electric Corp., Western Pipe & Steel Co., Hunt, Mirk & Co., and other industrial concerns in San Francisco, has been named San Francisco district manager for the Pittsburgh Testing Laboratory which recently purchased Smith, Emery & Co.

• **Charles S. Haggarty** has retired as manager of E. C. Atkins & Co.'s branch at New Orleans. **Howell Waddle,** formerly assistant manager, succeeds Mr. Haggarty. Mr. Waddle has been connected with the company continuously since 1906, with the exception of an interim of about 2 yr.

• **Ralph O. Amsden, Jr.** has been added to the Reliance Div. of Eaton Mfg. Co. He will have his headquarters at the company's Detroit office. Others added to the division's sales dept. are: **John S. Kerr,** located at the Cleveland office; **John L. Knott,** New York; and **Clifford A. Esinhart,** Chicago office.

J. L. KLEIN, director of research, Jessop Steel Co.

• **J. L. Klein** has been appointed director of research of the Jessop Steel Co., Washington, Pa. Mr. Klein came to Jessop in 1943 as metallurgical research engineer and in 1944 became head research metallurgist. He was formerly with eastern research laboratory, Crucible Steel Co.

• **Edwin J. Meyers,** superintendent of the General Electric Co., Pittsfield, Mass., Motor Div., has been made assistant to the manager of the apparatus works. He joined the company in 1919.

• **Garfield Jenkins** has joined the Cleveland office of the James Flett organization. Mr. Jenkins formerly was associated with the Jones & Laughlin Steel Corp.

• **Frank K. Metzger** has been appointed manager of railroad sales for the Midvale Co., Philadelphia.

• **John Fellmann** has been appointed central regional sales manager, Deepfreeze Div., Motor Products Corp., North Chicago,

• **H. M. Switzer** has been named vice-president and general manager, National Stamping & Electrical Works, Chicago, subsidiary of Eureka Williams Corp.

• **Joseph C. Elliff** has been named vice-president and a director of Scott Radio Laboratories, Inc. Mr. Elliff formerly was vice-president of Stewart-Warner Corp., Chicago.

• **M. J. Parykaza,** district sales engineer, has been put in charge of the new Moline, Ill. sales office of Link-Belt Co. Mr. Parykaza has been with the company since 1922. **L. R. Clark,** district sales engineer, has taken charge of the Cincinnati sales office, and **C. C. Wiley,** district sales engineer, the Birmingham, Ala., sales office of the company. Mr. Clark has been with Link-Belt since 1927 and Mr. Wiley since 1926.

• **Austin L. Staley** has been elected president, and **William P. Farrell,** vice-president, of Universal Lubricating Systems, Inc., Pittsburgh.

• **J. F. Weller** has been appointed to the newly created post of sales assistant to the president of American Brake Shoe Co., New York. When the Brake Shoe organization took over its present Kellogg Div. in 1939, Mr. Weller was division president and remained in this position until 1945.

• **David FitzGerald** has been made manager of employee relations for the Plastics Div. of the General Electric Co., Pittsfield, Mass. He has been assistant to the manager of the division since 1940. **Guy M. Stone** has been appointed manager of the Coshocton, Ohio plant of GE's Plastics Div. The Coshocton factory is now under construction. He is presently serving as manager of the Lynn works of GE from where the laminating manufacturing operations are soon to be transferred. He has held this position since 1939.

• **Virgil M. Graham** has been appointed manager of technical relations for Sylvania Electric Products, Inc., Ipswich, Mass. He was formerly manager of the Sylvania industrial apparatus plant at Williamsport, Pa.

• **Gerald G. Lipke** has been transferred to Denver as district field engineer for Hagan Corp., Hall Laboratories and Calgon, Inc., Pittsburgh. Mr. Lipke will work with the companies' representative in the Denver area, the Denver Fire Clay Co.

• **Henry M. Reese** has been named special field sales application engineer of the Valve & Bender Div. of Parker Appliance Co., Cleveland.

• **Florence MacDonald Sayle,** widow of the late W. C. Sayle, has been elected to succed her husband as president of Cleveland Punch & Shear Works Co., Cleveland. Other officers elected were **Harvey J. Corrin,** vice-president; **Rawlinson E. McFadden,** treasurer; and **Charles W. Steadman** of the law firm of Hollington, Macdonald & Steadman, secretary and general counsel. **Edward Asbury** has been named plant superintendent.

• **William G. Zink** has been named assistant manager of the Los Angeles district of B. F. Goodrich Co. He was previously in charge of the Dallas district, where **Euell E. Bost** succeeds him, with Texas, Mississippi and Louisiana as his territory. **J. Ellis Huffman** is placed in charge of a new district established at Tulsa, covering Oklahoma and Arkansas, as well as certain counties in South Dakota, Illinois and Iowa. **James N. Davis** has been assigned to the Cleveland office as an additional automotive and aeronautical representative and **William R. Blake,** formerly in the Washington office, has been given the same assignment in the San Francisco district.

• **Kenneth P. Schory** has joined the staff of Product Designers, Chicago. He had formerly been associated with Grumman Aircraft Corp. and Dohner & Lippincott, New York.

• **H. Boller** has been appointed general superintendent of Chicago Great Western Railway Co., with headquarters at Chicago. **D. K. Lawson** has been appointed personnel officer succeeding Mr. Boller.

FRANK J. WOOD, chief engineer, Rolling Mill Div., Loewy Construction Co., Inc.

• **Frank J. Wood,** formerly with Goodman Mfg. Co., Chicago, has joined Loewy Construction Co., Inc. of New York as chief engineer of the Rolling Mill Div. Mr. Wood started his steel mill career with National Tube Co., Pennsylvania works, in 1917. He was also associated with Crucible Steel Co., Mesta Machine Co., the Leningrad staff of Freyn Engineering, and the Western Cartridge Co.

• **C. H. Strasser** has been appointed works manager by Norton Co., Worcester, Mass., at their electric furnace plant at Chippawa, Ontario.

• **E. V. Rippingille, Jr.** has been appointed plant manager of the new Plant No. 2 of Electro-Motive Div., General Motors Corp., La Grange, Ill.

• **F. B. Ennis** has been appointed manager of manufacturing of the General Electric Co.'s Wiring Device Div., Bridgeport, Conn. He came to General Electric in 1909 and was most recently superintendent of the wiring device section. **J. R. Murray,** who has been with GE 11 yr and was formerly assistant superintendent of the wiring device section, has been named assistant manager of manufacturing of the Wiring Device Div. and superintendent of the wiring device section. **C. A. Devore,** former general foreman at the Mt. Vernon, N. Y. works, has been named manager of the works. **H. R. Geiman,** with GE since 1931 and former general foreman in the Meriden, Conn. works, is now manager of that plant. **E. G. Hopkins** becomes manager of the Norfolk, Conn. works, where he formerly served as a foreman. **R. L. Priestley,** who began his association with GE in 1937 and was most recently a foreman in Norfolk, is manager of the new Saugerties, N. Y. works. **W. A. Stott,** whose service record with the company goes back to 1913, has been named manager of the Millerton, N. Y. works, where he was formerly a foreman, and **H. B. Turner,** who has been with the company since 1937, is manager of the Lowell, Mass. works, where he was formerly a general foreman.

• **Fred Clarke,** merchandise manager since 1939 of Western Electric Co., New York, has retired.

• **Alvah Smith** has been appointed advertising manager of the machinery dept. of the R. D. Wood Co., Philadelphia. He has been associated with the Wood Co. in various capacities for the past 20 yr.

...OBITUARY...

• **W. A. Givens,** 60, executive vice-president and director of Allegheny Ludlum Steel Corp., died May 29, following a cerebral hemorrhage suffered in his office at Brackenridge, Pa. He came to Allegheny Steel in 1925 as superintendent of the merchant mill.

• **John F. Maxwell,** 54, sales manager for Roadmaster Products Co., Chicago, died recently at Lansing, Mich. He was formerly a sales representative for Chrysler Corp. and was also service manager for Federal Motor Truck Co., Detroit.

• **Harry C. Donaldson,** 59, partner in the firm of Brumley-Donaldson Co., with offices in Los Angeles, San Francisco and Seattle, died May 19 at his home in Los Angeles.

• **Fred Mutchler,** 87, who in 1879 helped to start the Thompson-Houston Electric Co. in Lynn, Mass., which later became the General Electric Co., died recently. He retired in 1926.

• **Eugene R. Whitten,** 56, general field manager and superintendent of the Wide Band Saw Div. of E. C. Atkins & Co., Indianapolis, died May 26 after a short illness. He was associated with the Atkins company for 40 yr.

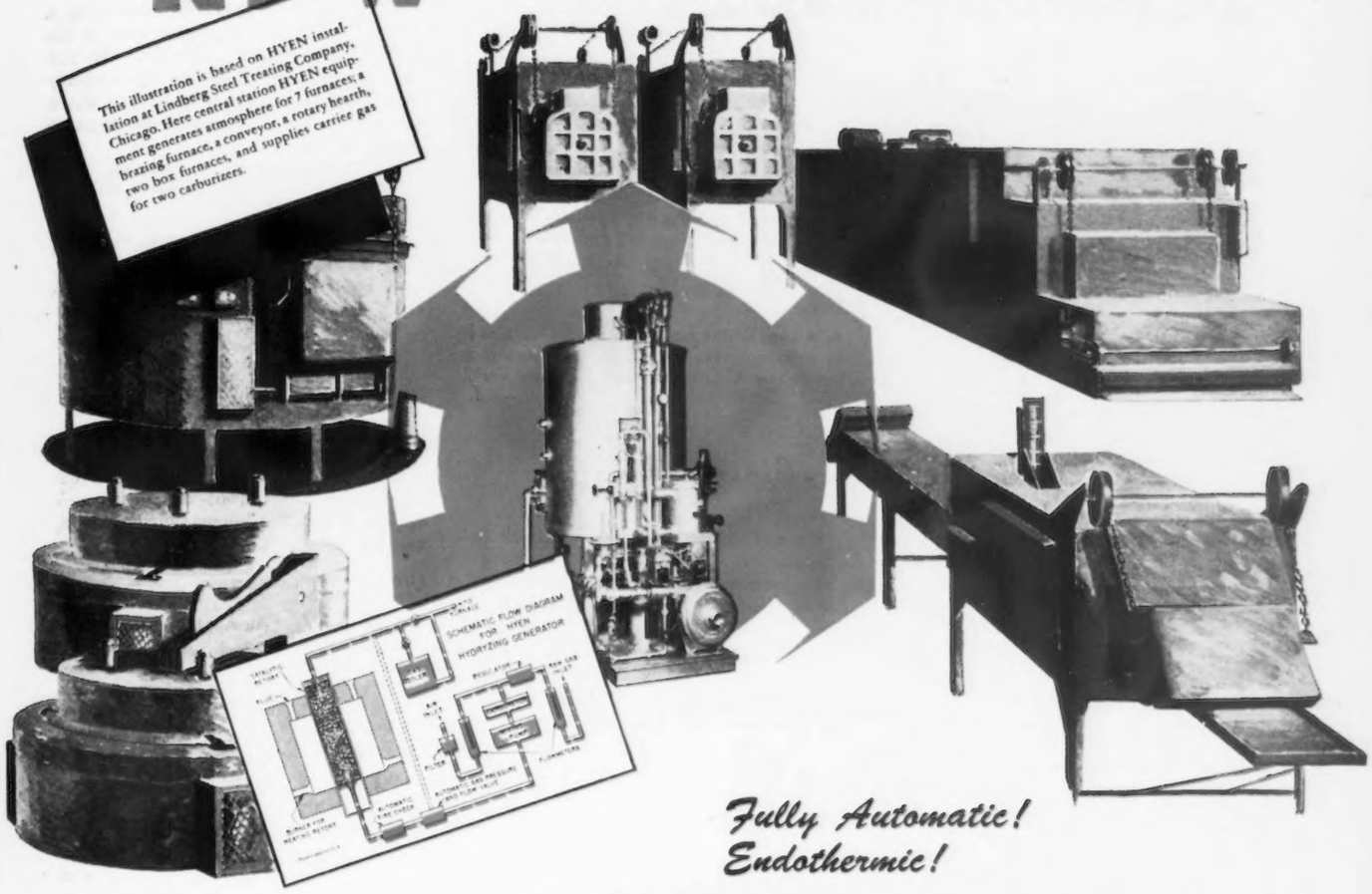
• **Leonard S. Webb,** vice-president and treasurer of the Webb Wire Works, New Brunswick, N. J., died suddenly on May 16.

• **Roy H. Crane,** sales promotion manager, the Liquid Carbonic Corp., Chicago, died suddenly May 24 of a heart ailment.

NOW

The New Lindberg "HYEN"

A CENTRAL STATION ATMOSPHERE GENERATOR TO SERVE A NUMBER OF FURNACES . . . . . .


This illustration is based on HYEN installation at Lindberg Steel Treating Company, Chicago. Here central station HYEN equipment generates atmosphere for 7 furnaces: a brazing furnace, a conveyor, a rotary hearth, two box furnaces, and supplies carrier gas for two carburizers.
SCHEMATIC FLOW DIAGRAM FOR HYEN HYDRYZING GENERATOR

Fully Automatic!
Endothermic!

For Hardening - Brazing - Sintering all medium and high carbon steels without decarburization!

The new HYEN is a central station generator that furnishes atmosphere for a number of furnaces. Like your air compressor, or electric generator, it's fully automatic —can be installed in an out-of-the-way location, and forgotten. It requires no charcoal, and does not have to be burned out periodically to remove soot.

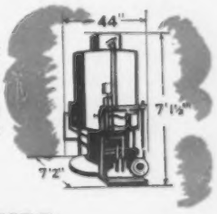
The HYEN produces a cleaner and drier gas of consistent analysis—no CO_2, minus 10°F dew point, methane 1.0%. Three and a half years of rigorous operation —both in the research laboratory and on the production line, have proved without question that the HYEN easily does a precise job, simply, and with consistent results.

FULLY AUTOMATIC

Light the pilot, and from then on every phase of the generator is automatically controlled through push-buttons. Temperature, mixing, pressure and flow control are fully automatic. Gas ratios do not have to be readjusted when furnaces are cut in or out of the line.

SAVES SPACE

The Hyen saves floor space—1500 CFH unit requires floor area of only 4 ft. by 7 ft. 2 in. Overall height only 7 ft. 1½ in. Four standard sizes available—500, 750, 1500, and 2500 CFH. Can be used with your present atmosphere furnace.



NO SOOTING

Time is saved and production increased because high temperature cracking eliminates sooting. Thus, periodic cleaning and burnout periods are not required.

REFRACTORY RETORT

Higher cracking temperature than ever before possible because a new type refractory retort is used. Result is cleaner and drier atmosphere—No CO_2—Minus 10°F dewpoint—methane 1.0%.

ATMOSPHERE FOR ALL STEELS

The Hyen can be simply adjusted to produce gas in equilibrium with any steel from 0.05 to 2.0% carbon content. When a single generator is used for a group of furnaces running tool and production medium and high carbon steels as in the example above, the generator gas is set to be in equilibrium with approximately 1.0 to 1.50% carbon content steel.

GAS OPERATED

The Hyen Generator operates on city gas, natural, propane or butane. It is an endothermic catalytic cracking type—uses only gas for both atmosphere and heating.

LINDBERG ENGINEERING CO.
2452 West Hubbard Street, Chicago 12, Illinois

The HYEN derives its name from HYdryzing and ENdothermic, and is one of the Lindberg line of four Hydryzing atmosphere generators. The others are HYEX (EXothermic cracking), HYAM (AMmonia dissociation), and HYCO (high carbon monoxide).

Write for the new 12 *page Bulletin No.* 190, *"Lindberg Controlled Atmospheres."*

LINDBERG FURNACES

Dear Editor:

LONG-RANGE LOCOMOTIVES

Sir:

I do not wish to be captious, but I question the accuracy of the caption over the illustration in the May 9 issue of the locomotive being built for long distance haulage in South Africa. Water capacity is stated to be 5560 gal. Even allowing for the fat Imperial gallon, that is considerably less than the locomotive water capacity of the C&NW class E Pacific type locomotive used for suburban and light passenger duty. This class has a capacity of 8275 gal. One doesn't get the opportunity to correct THE IRON AGE every day of the year, so I am not passing up this opportunity.

E. J. BAKER, JR.
Editor

Farm Implement News,
Chicago

● The matter of range appears to be strictly relative. Locomotive builders point out that from the viewpoint of British railway operations it is a long distance engine, but on the other hand from the viewpoint of American locomotive builders 5560 gal is definitely not for long distance work. A really long-range locomotive, American style, is the new Niagara type engine recently built by American Locomotive Co. for the N. Y. Central. This 4-8-4 locomotive has a water capacity of 18,000 gal and was designed for non-stop runs between Harmon, N. Y., and Chicago.—Ed.

WELDING ELECTRODES CHART

Sir:

In your issue of Jan. 3 you published a supplement showing a comparison chart on welding electrodes, listing the type numbers and grades of various manufacturers against the similar grades of the other manufacturers. We should like to receive four copies of this chart. A check for 80¢ is attached.

E. J. FLOOD,
District Sales Manager

Page Steel & Wire Div.,
American Chain & Cable Co., Inc.,
Chicago 6

● Reprints of the "Chart of Comparable Arc Welding Electrodes" have been sent. —Ed.

BRIQUETTING PRACTICE

Sir:

Will you please forward us a reprint of the article "What is Current Briquetting Practice," which appeared in the Oct. 29, 1942 issue.

R. JOSEPH

Commercial Steel & Chemical Corp.,
New York

● Unfortunately our supply of reprints of this article is exhausted, but we do have a tear sheet which we are forwarding.—Ed.

INTERNATIONAL TRADE BOOK

Sir:

On p. 108 of the May 23 issue there is an announcement of the publication of a new handbook on international trade. We would appreciate very much your letting us know where we may obtain a copy of this book.

H. M. WILSON
President

Taylor-Wilson Mfg. Co.,
Pittsburgh 19

● A copy of the handbook can be obtained by writing to the Committee for Economic Development, 330 W. 42nd St., New York. —Ed.

COMPARABLE TOOL STEELS

Sir:

We are attaching hereto a check in the amount of 45¢ and would appreciate your sending us three copies of the "Chart of Comparable Tool Steels" which appeared in the Feb. 1, 1945 issue of THE IRON AGE.

R. R. HERSHEY,
Milwaukee Div.

Steel & Tube Div.,
Timken Roller Bearing Co.,
Canton, Ohio

PERMANENT MAGNET STEELS

Sir:

We would like to obtain a copy of the article "Permanent Magnet Steels" by W. E. Ruder, which appears in the May 9 issue. Are reprints available?

R. SCHEMPP
Assistant Manager

Crucible Steel Co. of America,
Syracuse

● We didn't reprint this article; however, tear sheets have been forwarded with our compliments.—Ed.

PRECISION CASTING

Sir:

We are enclosing herewith an amount of $2 to cover the charge for two copies of the booklet on Precision Casting.

W. KAUDERS

Hydropress, Inc.,
New York

METAL FINISHING

Sir:

Enclosed please find 50¢ for which send us a reprint of the series on "Metals, Finishes, and Finishing Processes" by Edward Engel.

FRED J. KAIM
Research Engineer

Superior Plating & Rust Proofing Co.,
Minneapolis

MILL SUPPLY HOUSES

Sir:

We are interested in obtaining a book listing mill supply houses in the United States and Canada. If you should know of a publishing company who compiles such a book, we would appreciate your passing their name along to us.

GEORGE H. SELTZER, JR.
General Manager

Geo. H. Seltzer & Co.,
Drexel Hill, Pa.

● The publication "Mill Supplies" which is published by McGraw-Hill Co. at 300 W. 42nd St., New York 18, has a separate book containing these listings.—Ed.

THREAD ROLLING DIES

Sir:

Will you please forward to us three copies of thread rolling dies, this being a combination of articles which appeared in your journal on Nov. 2, 9, and 16, 1944.

C. BOWEN

Alfred Herbert Ltd.,
Coventry, England

● Tear sheets of "An Appraisal of Precision Thread Rolling Practice" have been forwarded.—Ed.

THERMOTOMIC

Sir:

In the Mar. 14 issue in "Newsfront" it is stated that "lower scrap losses, easier cleaning and better grain structures in both ferrous and nonferrous castings are said to result from a newly developed compound . . ." Has there been some article published on the use of this material?

H. L. LARSON

National Carbon Co., Inc.,
Cleveland

● This material, called Thermotomic, including its uses, was described in the article "A New Feeding Technique for Casting," in the issue of Apr. 25, p. 62.—Ed.

SHOT PEENING

Sir:

Please send tear sheets on the article "Shot Peening Effect on Aluminum" which appeared in the Dec. 27, 1945 issue.

L. J. WIESCHHAUS
Market Research Engineer

American Foundry Equipment Co.,
Mishawaka, Ind.

BABBITTING BEARING SHELLS

Sir:

Will you please send us tear sheets of the article "Babbitting Large Cast-Iron Bearing Shells" by L. F. Train, which appeared in the Apr. 4 issue on p. 84.

E. J. GILMORE
Engineering Dept.

Cleveland Graphite Bronze Co.,
Cleveland 10

YOUR KEY TO GREATER PROFITS

WHEELABRATOR BLAST CLEANING

WITH costs advancing steadily in the face of a relatively fixed selling price structure, the key to maintenance of profits lies in larger and more efficient production.

Speaking of that phase of your operations which we know best . . . the blast cleaning function . . . *both* of these production objectives can be attained by using the airless Wheelabrator method of speed-cleaning.

It turns out heavy pay loads faster than any other method yet devised. It saves valuable production space. Power is often reduced as much as 80%. Products are scoured so perfectly clean, right down to virgin metal, that subsequent machining and grinding operations are speeded up materially . . . at the same time cutting tools are kept keen and sharp for longer periods. These and other benefits accrue from Wheelabrating. And they all add up to the result management is looking for today . . . *greater profits.*

Nearly 3000 Wheelabrators are at work today in plants with problems similar to your own. Every last one was installed on the basis of *performance* . . . and that is the basis upon which we ask you to investigate them. We will gladly give you a demonstration at your convenience, and without obligating you in the slightest. Write, wire or phone us when you are ready.

Write for Catalog 74

American
FOUNDRY EQUIPMENT CO.
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PERFORMANCE "BRIEFS"

A large Eastern company replaced three 8' air-blast table machines with a No. 2 Wheelabrator Multi-Table. Only one man is now required to load, unload and operate the machine. Direct cleaning costs have been lowered 45.9%. Resultant savings amount to $7,270.05 annually.

●

3200 pounds of gray iron castings, ranging in size from one pound to 50 pounds are cleaned in one hour in a 27 x 36" Wheelabrator Tumblast at the Blue Valley Foundry Co., Kansas City, Missouri. Average cleaning time per load of 400 pounds is only three minutes.

●

A Wheelabrator Monorail Cabinet at General Foundry & Mfg. Co., Flint, Michigan, is removing burned-in sand from 18" Meehanite truck brake drums at the rate of 120 to 160 drums per hour. Compare this with the 14 castings cleaned in 50 minutes with their former tumbling mill process.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

This Industrial Week . . .

- **Steel Rate Climbs 20½ Points to 77.5 Pct**
- **Serious Scrap Shortage May Hinder Output**
- **Several Steel Price Changes Made by OPA**

SURPASSING even the most optimistic predictions made for steel recovery, the industry this week has raised its ingot rate 20.5 points to 77.5 pct of rated capacity. Thus from a low of 44.5 pct during the last week of the coal strike, the raw steel rate has climbed 33 points in two weeks. Indications are that unless scrap shortages interfere, the rate next week may bound beyond 85 pct of capacity.

The one factor which could seriously retard the unprecedented recovery in steelmaking is the critical scrap shortage at the larger midwestern and eastern steel producing centers which has already held the brakes on higher production during the recovery period. Had ample scrap supplies been available, steel producers would not have been forced to place such complete dependency on the resumption of blast furnace operation and could have raised their ingot output to a point this week which might have seen the industry back to pre-coal-strike activity.

Major attention in the industry is now being focused on the scrap supply situation, especially since many firms during the coal strike almost completely exhausted large scrap reserves. These were assembled by mills earlier this year when the steel strike forced down practically all steel plants. Only limited amounts of production scrap from manufacturing plants have reached steel mills, and efforts to bring in so-called country scrap from remote points are meeting with little success.

The question of increasing scrap price ceilings is coming to a head, but the scrap trade and industry consumers are divided as to whether an increased price would attract more material. Some steel producers are not opposing the plea for a moderate scrap price rise and others would be willing to pay more for scrap without recourse to an increase in steel prices, provided additional scrap supplies could be obtained.

MORE serious, and reflecting a condition which occurred frequently during the war, is the result of intensive scouting efforts which thus far have revealed little scrap to be purchased at any price. While entreaties have been made for more and more scrap collections, the memory of past scrap drives leaves doubt in some minds as to the ultimate gain in the total supply of material to be obtained.

The OPA this week has taken the long-delayed price action on alloy steels, nails and bale ties. Alloy steels were advanced 4 pct on Mar. 1, but the latest order wipes out this increase and replaces it with an 8.2 pct advance. Customers who have received shipments of alloy steels at the old prices will be billed for the difference retroactive to Feb. 15.

The increase in nails, the government hopes, will spur production of housing. Although it amounted to $10 a ton, it was at least $5 less than the industry had insisted would be required to bring enough nail capacity back into production in order to relieve the current nail shortage. Bale ties were boosted $4 a ton, and this action is expected to step up production and to some extent relieve a serious shortage in the farm belt.

The action of the Civilian Production Administration in instituting a self-certification system which will give preference to housing, government, agricultural and warehouse needs is expected to alleviate the tight situations in these fields. Whether or not the farmers will benefit depends to some extent upon the duration of strikes at two major farm equipment plants. The principal problem of other farm equipment plants is the securing of components from suppliers rather than steel.

TINPLATE production suffered only slightly during the coal strike despite what some producers regard as an unfavorable pricing situation. Talk of higher ceiling prices on tinplate as an incentive for greater production is countered by the reminder that producers were not able to take advantage of the Mar. 1 increase on tinplate because contracts with principal can makers had already been signed. Furthermore, it is indicated that even removal of tinplate from price control would have little effect on tinplate production. Trade relationships for this product are such that the greatest tonnage possible is usually made when sufficient strip is available.

A proposal that preference assistance be given to steel for freight car repairs has been turned down. It is understood that OPA action decontrolling railroad specialties including truck sides, wheels, axles, ends and fabricated specialties may assist car builders in securing these supplies. The railroads, however, still face the problem of obtaining rail spikes, bolts and tie plates which are unaffected by OPA's reported decontrol order.

Evidence is piling up that the newly formed Portsmouth Steel Corp., which acquired the Portsmouth plant of Wheeling Steel, will be a nucleus for a large midwest steel firm, the purpose of which will be to supply material for the Kaiser-Frazer automobile plant. While reports are current that the new steel company is interested in acquiring the Granite City Steel Co., this has been denied by the president of the latter firm. Further reports indicate the Portsmouth company is interested in the facilities of the Newport Rolling Mill Co., a subsidiary of Andrews Steel Co., Newport, Ky.

• **FOREMEN'S ASSOCIATION VOTED DOWN**—The No. 1 organizing campaign of the Foremen's Assn. of America in the steel industry, which the association had claimed had garnered hundreds of members, was deflated with a bang last Thursday when foremen at the Gary Sheet & Tin Mill of Carnegie-Illinois Steel Corp. turned down the organization as its bargaining agent. In an election conducted by the National Labor Relations Board, 331 votes were cast on the question "Do you favor Foremen's Assn. of America as collective bargaining agent in this plant." When the votes were tallied, there were 225 "noes", 55 "yesses", with 43 challenged by management, seven by the association, and one void. The election was regarded as having particular significance in view of Case Bill provisions against foremen's unions. After the Gary setback, mill officials in the Chicago district feel the FAA efforts will be damped indefinitely.

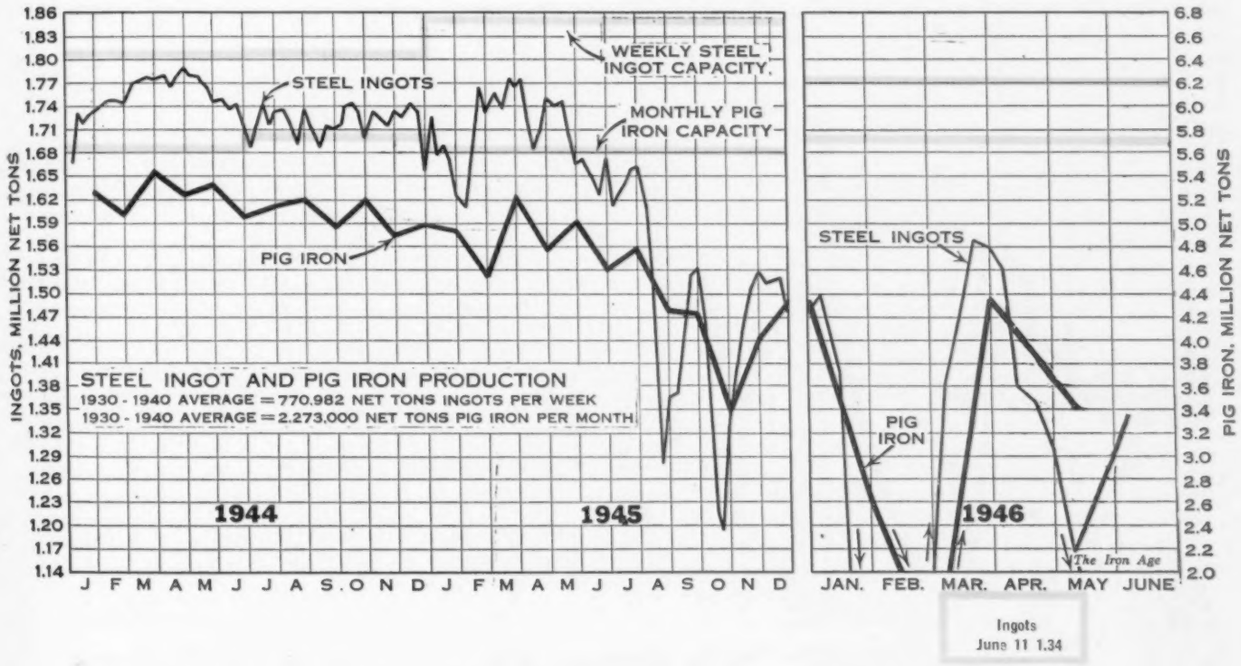
• **GENERAL DELIVERY**—Mill schedules are running, on the average, between two and three weeks behind what was originally planned. In specific items this situation is far more critical. For example, flat-rolled and small bar schedules are farther behind than two or three weeks. Despite the priority treatment given flat rolled in the past month and a half, carryovers into the third quarter will be heavy.

• **STEEL CUSTOMERS**—Mills are being barraged by steel buyers for definite delivery promises. The coal strike gave consumers time to review and adjust their production schedules and, probably for the first time since the war ended, they have a pretty firm idea of what they need and when they need it. Consequently, they are knocking on the doors of the mills with demands that show considerable realism and will not be brushed aside by vague promises for future delivery.

• **CONSTRUCTION STEEL INQUIRIES HEAVY**—Inquiries for fabricated structural steel and reinforcing bars appear to be affected little by the more stringent regulations on building projects recently adopted to push along the housing program. The big loophole, which enables a heavy volume of projects to slip by, is the exemption from controls of highway, bridge and government projects, which together ask for several thousand tons of steel each week. Most major mills are rolling so little reinforcing steel that few bids are received on most government inquiries. The Bureau of Reclamation is reported to have pleaded with producers individually to bid on projects for which no tenders previously had been received.

• **SCRAP SHORTAGE CURTAILS PRODUCTION**—With coal shortages behind them, the biggest barrier to production facing major midwestern and eastern mills now is lack of scrap. If scrap could be secured for openhearth furnaces now out of production, it is estimated that the industry's national operating rate might be raised more than 5 points. The mills piled up large scrap reserves during the steel strike, but these melted away rapidly in an effort to maintain production during the coal strike. The cupboard now is virtually bare, and reliance placed on incoming shipments. Reduced operations by manufacturing plants provide only a limited amount of scrap and efforts to bring in more country scrap are meeting little success.

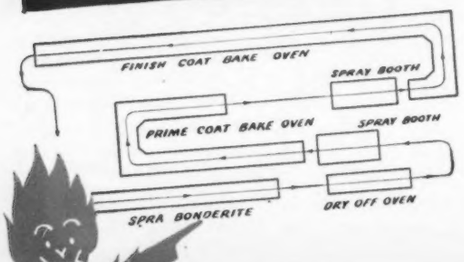
• **CPA ALLOCATIONS**—Some mills are still working on the premise that these allocations no longer exist. During the steel strike they were lifted for expediency purposes, but CPA never reinstated them. Consequently, not much attention is being paid orders bearing the CPA's priority treatment symbols.


INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
STEEL INGOT AND PIG IRON PRODUCTION
1930 - 1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930 - 1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
1944
1945
1946
J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
The Iron Age
Ingots
June 11 1.34

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 4	40.0*	63.0	61.0	56.0	75.0*	85.0*	60.0	56.0	100.5	58.0	70.0	59.0	97.5	57.0*
June 11	75.0	80.0	67.0	75.0	85.0	99.5	75.0	89.0	98.0	57.0	70.0	60.0	98.0	77.5

* Revised



Rust-proofing unit of a typical DESPATCH FINISHING SYSTEM

An integral part of a typical DESPATCH Finishing System, this 78-foot, 5-stage unit rust-proofs new frozen food cabinets at the big St. Cloud, Minn., plant of the Franklin Transformer Mfg. Co.

Expertly designed by DESPATCH to fit the space-saving layout shown below, this unit processes a cabinet in 15 minutes. Endless monorail conveyor carries cabinets and parts through hot alkali, hot water rinse, Spra-Bonderite, cold water rinse and chromic acid rinse. In each section spray nozzles (492 in all) direct uniform flow of water or chemicals onto cabinets at desired temperature and pressure.

This complete DESPATCH Finishing System helped this company reconvert from a war plant to a civilian industry IN LESS THAN 3 MONTHS!

Single Units or Complete Systems

PROMPT DELIVERY
IMMEDIATE INSTALLATION

DESPATCH OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

NEWS OF

New Midwest Steel Company to Furnish Steel For Kaiser-Frazer Cars

UNCONVENTIONAL KAISER: *With conventional reardrive substituted for proposed front wheel transmission of the Kaiser, this car is called Kaiser Special. Next to it are Henry J. Kaiser, left, and his partner, Joseph W. Frazer.* • • •

Cleveland

• • • **A new steel company**, Portsmouth Steel Corp., which will acquire the Portsmouth Works of Wheeling Steel Corp., at Portsmouth, Ohio, for $12,000,000, has been organized by Cyrus S. Eaton, prominent industrialist and banker, and a group of associates including William R. Daley, president of Otis & Co.

Main objective of the new steel corporation, will be to supply Kaiser-Frazer Corp. and Graham-Paige Motors Corp. with a substantial part of their requirements for automobile sheets, according to the registration statement filed June 7 with the Securities and Exchange Commission at Philadelphia.

Sheets for Kaiser-Frazer Corp. and Graham-Paige Motors Corp., will be rolled for Portsmouth Steel Corp. by Wheeling Steel Corp. at Steubenville Works, Steubenville, Ohio. Present plans call for delivery of 5900 tons a month up to Oct. 1, and 7900 tons a month thereafter.

Balance of the sheet requirements will probably come from Great Lakes Steel Corp., at Detroit, which will roll them from ingots shipped from Henry J. Kaiser's Fontana, Calif., plant (THE IRON AGE, June 6, p. 111).

According to the registration statement, Portsmouth Steel Corp., which was incorporated May 23, will issue 1,025,000 shares of common stock to the public at $10 per share. Underwriters of the new issue will be Otis & Co., Cleveland.

Mr. Eaton announced that an additional 300,000 shares of the common stock of Portsmouth Steel Corp. would be issued, of which Kaiser-Frazer Corp. had agreed to purchase 200,000 shares and Graham-Paige Motors Corp. 100,000 shares at the public offering price.

For the $12,000,000 purchase price, Portsmouth Steel Corp. will acquire Wheeling Steel Corp.'s Portsmouth Works, the Emperor Coal Co., the Portsmouth inventories and work in process, and working capital.

Portsmouth Steel Corp. will have a capacity of approximately 50,000 tons of steel ingots per month, and will engage in the manufacture of a variety of steel products including ingots, slabs, sheet bars, tie plate and wire products. Portsmouth works covers approximately 180 acres of land and includes a byproduct coke plant with an annual capacity of approximately 450,000 tons; ten openhearth furnaces, with a rated capacity of 612,000 tons; a blast furnace with a capacity of about 285,000 tons; a blooming mill with a capacity of 530,000 tons; a bar mill with a capacity of 520,000 tons; a billet and sheet bar mill with a rated capacity of 520,000 tons; a rod mill with a capacity of 192,000 tons; a wire mill and a number of other units including iron steel and brass foundries.

Mr. Eaton, who will head the Portsmouth Steel Corp., has been active in the steel industry for many years. He organized the Republic Steel Corp. and is a director of the Cliffs Corp., and has been associated with Otis & Co., underwriters of the new issue, for many years. Otis & Co. also were the principal underwriters for Kaiser-Frazer Corp. in its financing.

Wheeling Steel to Expand Ingot Capacity

Wheeling, W. Va.

• • • **Plans for** the modernization and expansion of its plants in the Wheeling district were announced June 7 by Wheeling Steel Corp. The plans call for an expansion of ingot capacity totaling about 25 pct, and the expansion will center mainly at the company's newly acquired Mingo plant, purchased from Carnegie-Illinois Steel Corp. It is estimated that the contemplated improvements, over a period of years, may involve the expenditure of about $50 million at the plants at Mingo, Steubenville, East Steubenville, Yorkville and Wheeling. Confirmation was also made of the sale of the company's Portsmouth, Ohio, plant to the newly formed Portsmouth Steel Corp.

Operations at Portsmouth will be continued without interruption by the new owner.

The Mingo plant property comprises about 156 acres with some 5000 ft of river front with modern docks. Present equipment includes three blast furnaces, two Bessemer converters, two hot metal mixers,

numerous mill buildings, cranes, and auxiilary equipment adapted to iron and steel production.

In addition to modernizing existing facilities, Wheeling plans to build additional coke producing equipment and openhearth furnaces with necessary rolling mill equipment. Also, it is planned to interconnect Mingo with the Steubenville and East Steubenville plants, most likely by rail.

The close physical relationship of the three properties will obviously make for a well balanced and highly integrated setup for the production of light steel products. Rail and river connections with the company's Yorkville works aid in the proposed expansion of tin mill products at this plant. Tin mill capacity was formerly centered at the Portsmouth plant.

Annual ingot capacity after the expansion program is estimated at 2,000,000 tons or more. The reduced cost of production and other economies obtained as a result of the expansion program should materially improve the company's competitive position and increase its earning power, company officials state.

Nail Producers to Increase Production; $10 Price Rise Helpful

Washington

• • • **Predicated on** a sufficient price increase to enable producers to make a profit, nail manufacturers have promised CPA to step up production which is urgently needed for the veterans' housing program and other essential projects. One large producer, at a recent meeting of the newly formed Wire Products Industry Advisory Committee with CPA, said his company would attempt to increase production by 30 pct. Another promised a 12 pct increase, while a non-integrated producer indicated a 100 pct jump if the hot mills would make sufficient wire rods available.

The Wire Products Committee told CPA that bale tie production would also be increased to a rate that will meet current farm requirements in harvesting 1946 crops. This production increase will be effected through funneling an increased amount of wire rods, it was stated, to non-integrated bale tie producers. CPA officials said that approximately 110,000 tons were needed this year compared with an indicated 80,000-ton production. The higher demand was attributed to increased crops and to a new type of baling machine which is said to use more wire per ton of fodder than some of the older type machines. In assuring the required production, industry spokesmen recommended that CPA follow through on its previous actions in its endeavors to get larger stocks of wire and wire rods released from surplus stocks for bale tie output.

Recommendations for increasing nail production called for an immediate investigation of supplies held by the services with a view to getting all excess nail stocks declared surplus. It was also suggested by industry members that CPA recommend that all producers and distributors of nails use larger size nail kegs than the standard 100-lb size when available. The purpose of the suggestion is partially to overcome the keg shortage.

Emphasizing that despite the steel and coal strikes, nail production has been maintained at a rate during March and April comparable with the 642,931 tons produced in 1945, industry reported that the demand for the veterans' housing program was superimposed on otherwise peak peacetime production requirements.

Price Boosts Granted

• • • Answering long-standing pleas from producers, the Office of Price Administration this week granted price increases of $10 per ton on nails and $4 per ton on bale ties. The increases are designed to help overcome bottlenecks in the farm and housing programs. Simultaneously, the 4 pct increase in alloy steel prices granted following the steel strike was superseded by an 8.2 pct advance to be retroactive to Feb. 15.

Portsmouth Interests Reported Dickering With Other Mills

Cleveland

• • • **Formation of Portsmouth** Steel Corp. under the aegis of Cyrus S. Eaton, Cleveland financier, may be only the first move in the formation of a new Midwestern steel federation to absorb or work with other independent mills, feelers extended by the Eaton interests indicate.

Pale shades of the Midwest Steel Corp., which died aborning in the middle thirties and which would have constituted a third giant steel company, are seen in conversations held with producers. Great Lakes Steel Corp. already has been identified with the Eaton-Kaiser-Fraser effort to secure sheets for automobile production by a reported agreement to roll sheets from slab ingots produced at Kaiser's Fontana, Calif., mill.

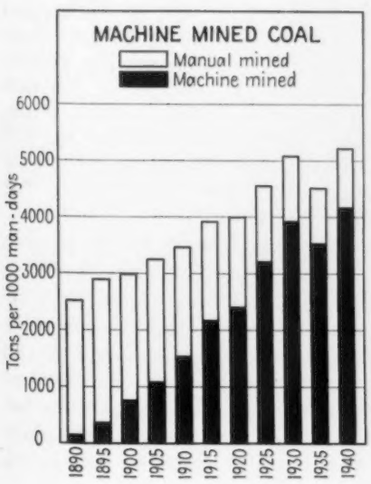
At least one other large Midwestern mill was approached on a similar basis, presumably to roll sheets either from Fontana ingots or from sheet bar produced at Portsmouth, but rejected the proposal. It is pointed out that sheet finishing agreements thus far known or announced provide an outlet for only about one-quarter of maximum semi-finished production of the Portsmouth mill.

Current reports have the Eaton interests eyeing the facilities of the former Newport Rolling Mill Co., Newport, Ky., for possible acquisition or finishing agreement on a toll basis. This mill listed an annual capacity of 180,000 tons of hot rolled and hot rolled annealed sheets and 100,000 tons of cold rolled sheets. Sheet bar could be shipped from Portsmouth to Newport by river barge.

Widely prevalent reports that Portsmouth would acquire or make a finishing agreement with Granite City Steel Co., Granite City, Ill., in the St. Louis district have been denied by Hayward Niedringhaus, Granite City president. The Granite City plant, long idle by strike, has no excess finishing capacity, Mr. Niedringhaus said. As a separate integrated unit Granite City would be an attractive addition to the Portsmouth combination.

Mechanical Coal Mining Gains as Labor Costs Rise

• • • Mechanical mining is assuming new importance in the drive to hold steel's raw material costs within reason. Typical of the modern equipment being used on the problem are the devices illustrated here. Top, universal cutting machine slices 9 ft deep into rich Pittsburgh vein in first step of the modern process. The cutters operate at all angles, are used to cut top, bottom and sides, require a 2-man crew. The center photo shows machine runner and helper preparing holes in face of vein for blasting. In the final step a loading machine moves in to convey the broken coal directly to cars. Photos were made at Liesenring No. 2 mine of U. S. Steel's H. C. Frick Coke Co., near Uniontown, Pa.



Bitter Fight Expected in Senate Over Unrestricted Extension of OPA

Washington

• • • **Capital interest this** week has centered on Administration efforts to recover from a second body blow dealt OPA legislation, this time by the Senate Banking & Currency Committee.

In view of the thumbs down action by the Committee, little chance is seen at the moment for passage of OPA extension legislation in anything near the form sought by the Administration which desires unrestricted extension of the price agency's control over business and enterprise for another year.

In any event, the amendment-ridden bill sent to the Senate floor last Thursday from the Committee is certain to touch off one of the sharpest and perhaps bitterest fights in recent years. Far from modifying or softening the House version which has been described by the agency's proponents as "emasculating OPA," the Senate Committee tacked on amendments of its own which caused Stabilization Director Bowles to take to the radio and heatedly describe the measure as "a monstrous thing."

As sent to the Senate floor, the measure would:

(1) Extend the price control act for another year, allowing the agency to die June 30, 1947 (as against the House proposal to end it next March).

(2) Transfer all control over food and agricultural products to the Dept. of Agriculture and specifically making it mandatory to end control of meat and dairy product prices on July 1, 1946.

(3) Extend the subsidy program for only 10 months, reduce food subsidies to $1 billion, and forbid new subsidization in the food line.

(4) Do away with the maximum average price program, designed by OPA to force production of low-price items; establish a 3-man board to direct lifting of controls on nonagricultural products; and establish a decontrol policy which would bring about an end to all controls on all nonessential items.

(5) Restore profit mark-up provisions for manufacturers of automobiles, farm machinery, refrigerators, and such other products as were virtually out of production during the war.

(6) Provide a hands-off policy on prices of cotton in general, including repeal of high-margin requirements for traders on the cotton market; provide for a 5 pct incentive increase for cotton products when production reaches a certain level, and grant allowances for cost plus, 1939-41 profits for cotton and wool textile makers.

"If the bill reported out by the Senate Banking & Currency Committee becomes law, effective price and rent control will end," Mr. Porter said dolefully. "In food and clothing, price control would be virtually eliminated. Household electric appliances and farm implements prices will be raised by hundreds of millions of dollars."

Another school of thought holds that Administration strategy will be to veto the measure unless greatly modified before passage, thus tossing the whole matter back into the lap of Congress. The legislative body, having no time to work up a new measure before OPA expiration date of June 30, thus would be virtually forced to pass a joint resolution extending the life of the agency "as is" until new legislation could be agreed upon.

PREVIEW: *These seamen, who walked off a ship at Seattle recently to attend the union meeting leaving the vessel stranded, may represent a preview of the Maritime strike slated for June* 15.

Follansbee Plans Merger

Pittsburgh

• • • **At a special** stockholders' meeting, called for June 26, Follansbee Steel Corp. will present a recapitalization plan that will merge Follansbee Steel Corp. and its subsidiary, Sheet Metal Specialty Co. The plant will eliminate the preferred stock of Follansbee, which will be exchanged for $80 face value of 4.5 pct cumulative income convertible debentures and two shares of common stock of the surviving corporation. The new common would be $10 par value and the present common would be exchanged, share for share.

Follansbee Steel Corp. is also negotiating with the Parkersburg Steel Co., successors to the Parkersburg Iron & Steel Co., to lease and operate the sheet rolling and finishing facilities of the plant at Parkersburg, W. Va. Follansbee will roll silicon sheet at this plant should negotiations be concluded.

Weekly Gallup Polls . . .

Public Wants Regulation of Labor Unions

Princeton, N. J.

• • • **If it is true** as some people claim that the force of public opinion ultimately decides major public controversies, then organized labor in the United States may be in for a rough time, according to George Gallup, director, American Institute of Public Opinion.

The majority of voters have felt for many months that Congress should do something positive about the strike situation.

The views of the country on many aspects of the controversy have been polled in recent weeks and months. Among the principal actions favored by the public are the following:

(1) A law to prohibit featherbedding or make-work practices on the part of unions.

(2) A cooling-off period before any strike can be called, with investigation made of the issues during the waiting period.

(3) Compulsory arbitration of labor disputes.

(4) Calling off all strikes and lockouts for a period of one year, as proposed by Bernard Baruch.

(5) A law prohibiting all strikes in public utilities, such as gas, electric, telephone and local transportation companies.

(6) Drafting strikers into the army if they are striking against the government. A first check of sentiment across the nation on this issue, conducted by telegraph earlier in the week, found 53 pct in favor of the draft proposal, 38 pct opposed, and 9 pct undecided.

The first chance which the public as a whole will have to manifest its views on the situation will be in the coming Congressional elections. As far back as January of this year the majority of voters polled by the institute listed union control legislation as the No. 1 issue in the 1946 Congressional campaign.

The public is not anti-union; polls in the past have consistently found large majorities supporting the principle of collective bargaining. Nor is the public out of sympathy with the idea of wage increases for workers. For example, the majority of voters felt that the strikers at General Motors last winter were entitled to a 15 pct wage increase. Moreover, two out of every three voters favor raising the national minimum wage from 40 to 65¢ an hr.

But the public, irritated by strikes during the war and during the reconversion period, has grown increasingly critical of the tactics and methods used by union leaders to achieve union goals.

Judging by the evidence of polls, union leaders have not been able to state their case in a way to convince the general public of the rightness of their tactics. Unless they are able to halt the trend of popular sentiment, the age of labor union regulation is dawning.

•

• • • **In the handling** of labor disputes an increasing majority of Americans favor a tougher program, in at least one respect, than the program advocated by the Truman Administration.

Whereas the President has upheld labor's right to strike, except against the government, the majority of the country's voters are in favor of forbidding all strikes in one particular type of industry—public utilities, such as gas, telephone, electric power, and local transportation companies. Even among labor union members, the majority with opinions on the subject favor the curb.

One state, New Jersey, has already adopted a law to control strikes in utilities, and the law was recently invoked by Governor Walter E. Edge when he seized struck gas and coke plants of the Public Service Electric & Gas Co. and kept them running until agreement was reached.

The country's attitude toward strikes in public utilities can be seen from the following trend.

"Should laws be passed to forbid all strikes in public service industries such as electric, gas, telephone and local transportation companies?"

Although Majority Supports Union Demands, Criticism Of Tactics and Methods Grows

o o o

	Today Pct	Last month Pct
Approve law to forbid utility strikes	64	60
Disapprove	29	32
No opinion	7	8

In the April poll conducted on the subject, a majority of labor union members included in the survey were opposed to anti-strike laws for utilities. Today, however, sentiment has changed to the point where more union members favor than oppose the step.

The trend is shown below:

UNION MEMBERS

	Today Pct	Last month Pct
Approve law to forbid utility strikes	49	40
Disapprove	44	52
No opinion	7	8

A majority of both Republican and Democratic voters favor the legislation, although the majority is larger among Republicans than among Democrats.

VOTE BY PARTIES

	Democrats Pct	Republicans Pct
Approve	61	70
Disapprove	32	24
No opinion	7	6

•

• • • **While the path** of reconversion has taken many completely unexpected turns during the months since the war's end, one encouraging fact stands out:

The great mass of American workers are not beset by fear of the economic future.

Fewer than one in every 10 among those now regularly working think there is a great chance that they will be unemployed during the next year.

This has important implications for the entire U. S. economy. A man who is not afraid of losing his job tomorrow is inclined to spend money for a new car, a new

[CONTINUED ON PAGE 149]

UP THE LADDER: *Judge Fred M. Vinson, who was recently named Chief Justice of the United States, was formerly Secretary of the Treasury. He is one of the country's outstanding students of taxation.*

See OWMR Terminated As Vinson and Snyder Accept Important Posts

o o o

• • •

Washington

• • • **Little or no** reaction on industry may be expected from the folding up of the Office of War Mobilization and Reconversion. It is about to pass out of the picture now that Director John B. Snyder has been appointed Secretary of the Treasury by the President to succeed Judge Fred M. Vinson who has been named Chief Justice of the United States.

OWMR, a war-born bureau of considerable power in its earlier days, has been of little importance in the peacetime period. With the ending of the war its activities as they bore on its prosecution automatically were terminated and part of its title became obsolete. In its policy on reconversion, OWMR had no great influence despite its ostensible power with relation to prices and related economic issues.

Largely, OWMR has been on what is known as the conservative side but only partially succeeded in effectuating its policy. Indicative of this point is OWMR's position respecting steel pricing, that developed from the USWA steel strike. OWMR, in its willingness to permit substantial price increases in steel, ran into sharp conflict with Chester Bowles, then head of OPA, who had steadfastly insisted that price boosts be limited to only $5 a ton. The upshot was a form of compromise, more favorable to OPA than to OWMR.

Now that Mr. Bowles, as Economic Stabilizer, likely will take over what remains of OWMR, it is conceivable that if it has any significance one way or the other the effect will be less favorable to industry. This conclusion is based on the assumption that Mr. Bowles continues in government service and is given White House support.

Mr. Snyder as Secretary of the Treasury probably will follow the policy of Mr. Vinson, one of the country's outstanding students on taxation and generally sympathetic to industry's complaints of repressive tax legislation.

Interestingly enough Mr. Snyder's appointment as head of the Treasury Dept. marks the third time that he has been named successor to Mr. Vinson. Mr. Snyder took over as Federal Loan Administrator in April 1945 when Mr. Vinson was moved from that job to the head of OWMR.

Judge Vinson became a prominent leader in the House of Representatives and was known particularly as a student of tax legislation. After serving in that branch of Congress for 12 yr he was appointed by the late President F. D. Roosevelt to the court of appeals of the District of Columbia and successively was made Director of Economic Stabilization, OWMR director, and Secretary of the Treasury.

J&L Pittsburgh Works Shut Down by Strike

Pittsburgh

• • • **Jones & Laughlin** Steel Corp.'s Pittsburgh works was hit by two crippling strikes early this week when its scarfers and its railroad employees walked out on strike. About 250 members of Whitney's Brotherhood of Railroad Trainmen walked off the job at noon Monday, June 10, because they didn't like the final deal on the railroad settlement. In addition to the granted wage increases, these employees wanted an additional week's vacation, time and a half for Sunday and holiday work, and the shift differential.

At midnight Sunday, 20 scarfers of J&L's No. 18 mill walked off the job, but as yet have presented no grievances and the union is reported to have labeled the walkout a "wildcat" strike. At 8:00 a.m. Monday, these strikers picketed mills No. 16, 17, and 18, barring any attempt of nonstrikers to enter.

As a result of the railroad strike, the Pittsburgh works of J&L began to shut down, and by 4:00 p.m. Monday, a company spokesman said that blast furnaces were all being banked and openhearths shut down. As the 4:00 p.m. shift arrived for work, railroad employees and striking scarfers picketed all J&L gates, barring entrance to everyone. Some 1000 railroad employees are affected by the walkout of the 250 trainmen.

CPA Juggles Ratings of Housing Radiation

Washington

• • • **Faced with a** production shortage of a possible 45 million sq ft of radiation for 1946, CPA has issued three orders intended to spur output of extended surface convector radiation and make the bulk of it available for the emergency housing program.

Most important of the orders was that of adding this type of radiation to the list of critical products (Schedule 1, PR 13), thereby making producers eligible for CC ratings in obtaining production, construction, maintenance and repair equipment and supplies.

In the second CPA action, this radiation was placed on Schedule A, PR 13, thus enabling builders to obtain it through HH preference ratings, and placing it on a par with cast iron radiation.

As a final move, after June 9, extended surface convector radiation will be included on the list of items which distributors and jobbers must set aside 70 pct for filling HH rated orders.

Officials estimated that production of all types of radiation for the year would amount to about 40 million sq ft (at present rate of production) as compared to estimated requirements of 85 million sq ft.

OPA Grants Price Relief In Several Metal Lines

Washington

• • • **A 20 pct interim increase** in ceiling prices of printing trades machinery and equipment has been granted by OPA to replace the 12 pct increase granted on Jan. 9, 1946. The action is effective as of June 8.

In addition to machinery and equipment as a whole, the increase applies to mechanical accessories, including repair and replacement parts. Unlike the original order, the increase applies to sales to all users and not to the printing trades alone.

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Washington

• • • **OPA has authorized** manufacturers of oil field equipment to raise maximum prices that have been fixed at Oct. 1, 1941, or March 31, 1941, "freeze" date levels 10 pct, effective May 31. The interim increase applies to drilling and producing machinery, equipment and parts, as well as water drilling machines and equipment. It does not include drill pipe casing, engines and tanks. Resellers were permitted to increase their maximum prices by the same percentage.

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Washington

• • • **In an order** effective June 4, OPA has authorized a 10 pct interim increase over base price levels to manufacturers of industrial electric storage batteries, pending final analysis of an industry-wide survey.

This action does not apply to automotive batteries nor does it affect the previous suspension from price control of wet cell storage batteries sold by a manufacturer to a brand owner.

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Washington

• • • **Manufacturers of** power-operated pumps and equipment may increase prices 15 pct over base period ceiling prices where the pump is sold with the power unit, and 8 pct when sold separately, the OPA announced on June 4. The order, which is effective June 5, also permits resellers to increase their prices by the same percentage as their net invoiced costs are increased by their suppliers.

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• • • **Price increases** for certain metal plaster bases and metal plastering accessories and vitreous enamel frit were announced by OPA on June 10.

The increases on plastering equipment average 11.4 pct over Oct. 1941 prices and range from 1.9 pct on a particular type of bullnose bead to 22.8 pct for a particular type of 3.4 lb metal lath. Four general types of mesh or rib metal lath, two of sheet lath and two of stucco mesh are covered by the action.

Resellers will be permitted to pass on the actual dollar-and-cent amount of the increase in the cost.

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• • • **OPA on June 10** announced an interim industry wide price increase of 8 pct for manufacturers of dairy machinery and at the same time permitted the price increase factor of 17.3 pct granted to manufacturers and resellers of cutting tools to be extended to repair services on the tools affected (THE IRON AGE, May 9, 1946, p. 132).

Resellers of dairy machinery will be permitted to pass on the dollar-and-cent amounts by which their costs are increased.

The increase for repair services applies to repairs on all cutting tools, attachments and accessories for machinery and machinery covered by the previous price increase.

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• • • **OPA has ruled** that makers of braided building wire and nonmetallic sheathed cable may continue to sell these products to the same chain stores at Zone B prices regardless of the zone in which located, provided this practice was in effect before the Oct. 15, 1941 base date.

Effective June 5, this deviation is seen as having little effect on the zone pricing method since gains from use of Zone B methods in Zone A are automatically offset when Zone B prices are applied in the higher priced Zone A.

This method may not be expanded to include stores which were not receiving this preference before the base date.

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Effective June 12, OPA suspended controls on the following items: basic refractory brick, crude and ground refractory fireclay, fireclay brick, hot tops, ladle brick, low temperature mortars, runner brick, silica brick, silica cement, sleeves and nozzles, and super clay and high alumina refractories.

What—Again?

New York

• • • The Soviets, according to Danton Walker in the New York *Daily News*, are due to give Wall Street the jitters when they come out with a new alloy, "Magnika," which he says may make steel all but obsolete. While the possibility of Wall Street getting the jitters is not discounted in well-informed circles, a quick survey of the steel industry indicates that the only fear is that it may be used in a perpetual motion machine.

Consumers Return Of Scrap to Mills Will Govern Output

New York

• • • **A grave shortage** of scrap threatens to thwart the steel industry's attempts to regain high production levels, Robert W. Wolcott, president of Lukens Steel Co., Coatesville, Pa., and chairman of the American Iron & Steel Institute committee on iron and steel scrap, said recently.

"Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills," said Mr. Wolcott, who is a recognized authority on scrap. "Unless everyone cooperates to start scrap flowing promptly, many consumers of steel may find steel difficult to obtain for months.

"The scarcity of scrap is due largely to the fact that industries which usually generate scrap in large quantities have not been operating at all or operating at low levels due to strikes in their own industries or strikes in the industries supplying them the raw materials," explained Mr. Wolcott.

Mr. Wolcott estimated that scrap supplies at steel mills are little better than in 1942 when some openhearth furnaces were idle because of lack of scrap. With a very tight situation existing in the supply of scrap over the past four to six weeks, the situation is bound to become very acute when steel mills are again able to resume full operations.

"During the strike that hit the steel industry in January and February of this year, little scrap was consumed, but on the other hand little was produced," said Mr. Wolcott. "During the 45-day coal miners' strike, with little or no pig iron being produced, inventories of scrap were virtually depleted through the more generous charges of scrap in order that the openhearth furnaces might keep operating to the maximum period of time.

"Battlefield scrap has not come back to this country to the extent that we expected. The movement of 'auto graveyard scrap' has been and will be hampered because of the value of replacement parts. Some scrap yards are experiencing manpower shortages.

"These factors, and others, will result in a lag in the movement of scrap as the steel industry strives to restore high operations. The best solution is for everyone who is waiting for steel to help himself by assisting the movement of scrap to the best of his ability.

"This is another period where all interests must cooperate, just as they did during the war when scrap was brought out by concerted efforts to help win the conflict.

"The complete return to normal in the flow of scrap cannot occur until the supply of new steel approximates the demand. Everyone who is waiting for a new automobile, a new kitchen range, farm equipment, or other products made of steel has an interest in helping the mills to get more scrap now."

Coming Events

June 17 **American Society of Mechanical Engineers,** machine design group, first session, Detroit.

June 17-18 **American By-Product Coke Institute,** first annual meeting, Seaview Country Club, Absecon, N. J.

June 17-20 **American Electroplaters Society,** annual convention, Pittsburgh.

June 24-28 **American Society for Testing Materials,** annual meeting, Buffalo.

July 22-23 **American Washer & Ironer Manufacturers Assn.,** French Lick, Ind.

Sept. 10-14 **American Chemical Society,** exposition, Chicago.

Sept. 11-12 **Society of Automotive Engineers,** national tractor meeting, Milwaukee.

Sept. 16-20 **Instrument Society of America,** first conference and exhibit, Pittsburgh.

Oct. 1-4 **Iron & Steel Exposition,** Cleveland Public Auditorium, Cleveland.

Oct. 3-5 **National Electronic Conference,** Chicago.

Oct. 3-5 **Society of Automotive Engineers,** aeronautic meeting and display, Los Angeles.

Oct. 28-30 **American Gear Manufacturers Assn.,** semi-annual meeting, Chicago.

Nov. 7-8 **National Founders Assn.,** annual meeting, New York.

Nov. 18-22 **National Metal Congress** and Exposition, annual meeting, Atlantic City, N. J.

New Practices Released

Washington

• • • **Effective June 30,** a voluntary simplified practice recommendation for hot-rolled carbon steel bars and bar size shapes has been approved by the Div. of Simplified Practice, Bureau of Standards. The recommendation, identified as "R222-46," covers the nominal sizes of rounds, squares, round corner squares, hexagons, half-rounds, ovals, half-ovals, bar sizes of angles, channels and tees.

The recommendation in printed form will be placed on sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., on or about June 20, for 10¢ each. A 25 pct discount from the list price will be applied to orders for 100 or more copies. Remittance, in the form of a check or money order, drawn to the "Superintendent of Documents," must accompany each order.

The London ECONOMIST

Unions With Communists

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

° ° °

STRAWS in the wind have been pointing lately to a widening cleavage between the non-Communists and the Communists in the CIO unions. One was the adoption, by the constitutional convention of the Utility Workers' Union of America, of a clause barring Communists from membership. No other CIO union constitution has such a provision. It was assumed that this drastic step could not have been taken without an approving nod from national headquarters. Another sign was a drastic rebuff made by Mr. Van A. Bittner, director of the current CIO organizing drive in the South, to a group of Communist-oriented union leaders in New York, who had set up an organization for the purpose of furnishing funds and other assistance to the southern drive. His rejection of the intended aid was worded with unusual rudeness. "No crowd, whether Communists, Socialists or anybody else is going to mix up in this organizing drive," was the reported statement. Mr. Bittner is an elected assistant president and one of the founders of the United Steel Workers of America, whose head is Philip Murray, president of the CIO. The rebuff, therefore, came from no heretic, but from an influential and authoritative interpreter of CIO policy.

Two other events are taken as outward signs of the alleged cleavage: The election of Walter P. Reuther, a pronounced anti-Communist, to the presidency of the politically significant United Automobile Workers union; and a statement of policy, directed against Communist intervention in union affairs, unanimously adopted by the convention of the powerful United Steel Workers of America.

On their face value these facts prove little. In the case of the Utility Workers, the motivation for the ban on the Communists came from the circumstances and experiences which had attended the earlier history of the group rather than from promptings by top CIO people. In fact, the national CIO would have had to apply pressure to prevent this action. That, seemingly, it did not care to do. Again, while Mr. Bittner has no love for the Communists anyway, his rebuke to the New York Communist group fits well with considerations of expediency: The Communist proffer of help would be generously exploited by the oppositoin to the southern drive.

THERE is no indication anywhere that the CIO leaders plan an immediate break with the Communist fellow-travelers. Yet a stiffening in their attitude appears clearly in the offing, to judge by the statements of Murray and Reuther. There is considerable difference, however, in the manner of approach of the two men to the issue: Mr. Reuther operates in a union severely disturbed by warring factionalism, and with limited power at his disposal, while Mr. Murray's union is solidly behind him and his own authority is unchallenged. Neither leader wishes to bar Communists from membership. Both use identical expressions to dismiss the thought. Reuther: "There will be no witch-hunting." Murray: "We engage in no purges, no witch-hunts." Tentatively, Mr. Reuther wants to

> "isolate the 10 pct . . . the people with outside political loyalties which they place above their loyalty to the union."

Mr. Murray's statement, which was expected to clear the atmosphere, more aggressively lashed out at outsiders. He said:

> "This union will not tolerate efforts by outsiders—individuals, organizations or groups—whether they be Communists, Socialists or any other group, to infiltrate, dictate or meddle in our affairs. I have in mind *any* attempt by *any* force outside of our membership to interfere in the functioning of our union."

It impressed, least of all, the Communists in the convention. The unanimous vote cast in favor of the Murray statement by no means indicated that there were no Communists among the delegates; convincing proof of their presence was available when a free-for-all fight broke out on the floor toward the end of the convention week. President Murray had a difficult time preventing a disorderly breakup of the convention; tension was strong. It continues to be so.

The leaders of the CIO are not happy over this state of affairs. What they apparently want to do is keep the Communists down without putting them out. They are not willing to initiate a show-down. They would rather the onus of secession rested with the Communists. But the Communists not only do not want to take the blame, they are apparently able to avoid doing so. For instance, the convention of the International Fur & Leather Workers' Union, thoroughly Communist-controlled, endorsed the Murray statement. They praised "no witch-hunting" and endorsed objection to outsiders. *They* are on the inside.

While in no wise controlling or dominating the CIO, as the AFL claims, the Communists are a force to be reckoned with in the organization. They run about a dozen CIO affiliates—one of these nationally significant—and that pretty much their own way. They also run the show in a number of local bodies or

(CONTINUED ON PAGE 146)

Canada Threatened By CIO Steel Strike

Toronto

• • • **Following the** refusal by the National War Labor Board to grant Nova Scotia steel workers wage parity with steel labor in Ontario plants, the Canadian steel industry is facing the possibility of an early strike. In a quick reaction to the Board's decision, C. H. Millard, national director of the United Steel Workers of America (CIO-CCL) called an emergency meeting of the Union National Advisory Committee to be held here June 9. Referring to the Board's refusal to grant wage parity Mr. Millard stated: "In view of the explosive situation created by the Board's order, and in review of reported failure of local unions in the three major steel mills to secure acceptance by any company of the union's peacetime objective, I am convening an emergency meeting of our union national advisory committee in Toronto for June 9. At this meeting we will decide steps deemed necessary in order to secure acceptance of our full program." A union official stated it is likely that a definite strike deadline will be set at the meeting.

Basic demands in the union peacetime program are a national minimum wage of $33.60 a week and a 40 hr week.

Hanna Transfers Mines

Cleveland

• • • **The M. A. Hanna Co.** announced June 7 that all of the coal mining properties of the Hanna Coal Co. in Ohio have been transferred to the Pittsburgh Consolidation Coal Co.

The consideration for the transfer of the properties was the issuance of 325,000 shares of stock by the Pittsburgh Consolidation Coal Co. which stock Hanna will hold for investment. Production from these properties totaled about 6,000,000 tons in 1945, including that from pit and strip mines.

This move concentrates in the Pittsburgh Consolidation Coal Co. all the bituminous coal mining operations in which the Hanna Co. is interested. The operation of these properties will continue in the name of the Hanna Coal Co. without change in personnel.

The Lake coal business in which the M. A. Hanna Co. has been an important factor for many years will be continued, as in the past, in the name of the Hanna Coal and Ore Corp.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period YEAR - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	52	1	XXXX	XXXX	XXX		XXXX	XXXX	XXX	6,874,314	2,149,626
Structural shapes (heavy)	11	2	9,580,550				XXXX	* 3,543,244	39.2	* 3,545,673	XXXX
Steel piling	4	3					XXXX	** 217,079		** 217,356	XXXX
Plates (sheared and universal)	27	4	17,841,320					* 7,188,337	40.3	7,062,329	554,199
Skelp	6	5	XXXX	XXXX	XXX			XXXX	XXX	744,545	365,560
Rails—Standard (over 60 lbs.)	4	6	3,669,000				XXXX	* 2,266,796	61.8	2,224,148	XXXX
—All other	5	7	512,000				XXXX	* 150,724	29.4	170,055	XXXX
Splice bars and tie plates	12	8	1,745,960				XXXX	* 753,584	43.2	779,057	XXXX
Track spikes	10	9	349,400				XXXX	158,586	45.4	165,038	XXXX
Hot Rolled Bars—Carbon	39	10	XXXX		XXX			* 8,288,867	XXX	* 6,612,897	1,022,743
—Reinforcing—New billet	13	11	XXXX		XXX		XXXX	* 719,339	XXX	* 750,442	XXXX
—Rerolled	14	12	XXXX		XXX		XXXX	* 79,066	XXX	85,006	XXXX
—Alloy	25	13	XXXX		XXX			* 2,638,691	XXX	* 1,960,873	219,798
—Total	46	14	*22,413,700					* 11,725,963	52.3	* 9,409,218	1,242,541
Cold Finished Bars—Carbon	24	15	XXXX		XXX		XXXX	* 1,633,698	XXX	1,614,156	XXXX
—Alloy	25	16	XXXX		XXX		XXXX	* 366,588	XXX	326,173	XXXX
—Total	32	17	3,015,910				XXXX	* 2,000,286	66.3	1,940,309	XXXX
Tool steel bars	17	18	273,010				XXXX	* 121,383	44.5	122,149	XXXX
Pipe & Tubes—Butt weld	15	19	* 2,223,520				XXXX	* 1,526,611	68.7	* 1,517,927	XXXX
—Lap weld	9	20	850,200				XXXX	* 490,843	59.1	505,951	XXXX
—Electric weld	11	21	1,570,900				XXXX	* 979,699	62.4	857,478	XXXX
—Seamless	16	22	3,377,700				XXXX	* 2,800,426	82.9	2,235,294	XXXX
—Conduit (cap. & prod. incl. above)	7	23	XXXX	XXXX	XXX		XXXX	XXXX	XXX	88,112	XXXX
—Mech. tubing (cap. & prod. incl. above)	12	24	XXXX	XXXX	XXX		XXXX	XXXX	XXX	669,130	XXXX
Wire rods	27	25	7,266,670					* 4,486,029	61.7	1,306,603	444,210
Wire—Drawn	41	26	5,664,690					* 3,439,164	60.7	2,059,214	117,046
—Nails and staples	19	27	1,253,360				XXXX	* 597,750	47.7	602,558	XXXX
—Barbed and twisted	15	28	539,610				XXXX	* 233,891	43.3	234,209	XXXX
—Woven wire fence	16	29	1,113,860				XXXX	* 376,795	33.8	373,920	XXXX
—Bale ties	12	30	149,700				XXXX	* 75,910	50.7	82,609	XXXX
Black Plate—Ordinary	9	31	XXXX	XXXX	XXX			XXXX	XXX	633,439	4,805
—Chemically treated	8	32	465,000				XXXX	* 128,083	27.5	114,949	XXXX
Tin and Terne Plate—Hot dipped	9	33	* 3,758,850				XXXX	* 1,953,922	52.0	* 2,046,153	XXXX
—Electrolytic	10	34	2,231,850				XXXX	* 861,543	38.6	861,634	XXXX
Sheets—Hot rolled	30	35	19,197,320					* 13,680,415	71.3	* 6,811,073	485,078
—Cold rolled	12	36	7,131,460				XXXX	* 4,711,991	66.1	2,891,180	XXXX
—Galvanized	16	37	2,915,130				XXXX	* 1,677,050	57.5	* 1,693,796	XXXX
Strip—Hot rolled	25	38	7,055,390					* 2,610,627	37.0	* 1,648,142	279,048
—Cold rolled	35	39	3,119,850				XXXX	* 1,350,161	43.3	1,275,670	XXXX
Wheels (car, rolled steel)	5	40	319,400				XXXX	* 291,375	91.2	292,637	XXXX
Axles	6	41	408,170				XXXX	* 142,176	34.8	* 146,867	XXXX
All other	5	42	190,490				XXXX	45,058	23.6	41,719	XXXX
TOTAL STEEL PRODUCTS	152	43	XXXX	XXXX	XXX			XXXX	XXX	*62,242,435	5,640,113
Effective steel finishing capacity	-	44	67,310,000	XXXX	XXX	XXXX	XXXX	XXXX	XXX	XXXX	XXXX
Percent of shipments to effective finishing capacity	-	45	XXXX	XXXX	XXX	%	XXXX	XXXX	XXX	84.1 %	XXXX

* Revised. ** Includes bearing piles.

During 1945 the companies included above represented 99% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

Maximum Annual Potential Capacity: Embraces the total tonnage of each product that could be produced under full operations assuming exclusive use of all available facilities and without regard to the availability of ingots. For those types of rolling mills and other producing facilities which produce more than one product, the full capacity for each product is shown, regardless of the fact that such producing facilities have not capacity to produce the aggregate tonnage shown for all such products. As an illustration, for a continuous strip-sheet mill producing both plates and sheets, the full capacity of the mill to produce each product is included, regardless of the other product.

Navy Turns Excess Aircraft Material Into Secondary Aluminum

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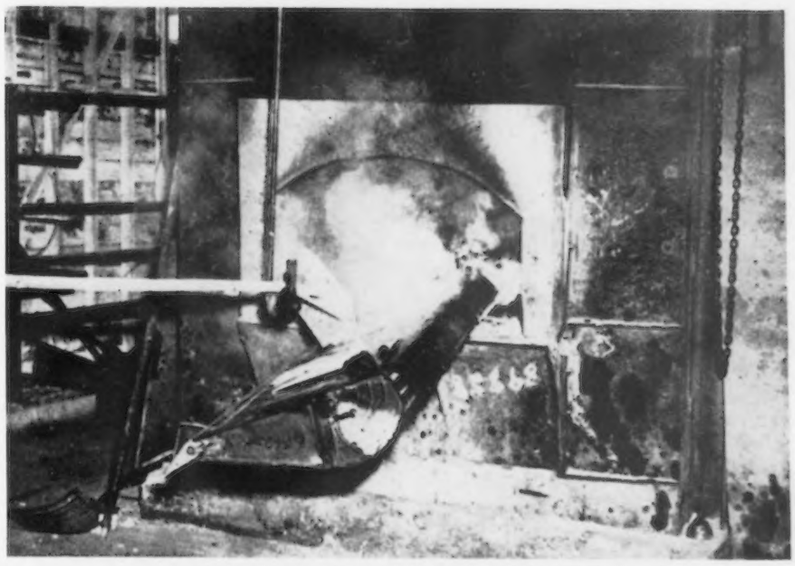
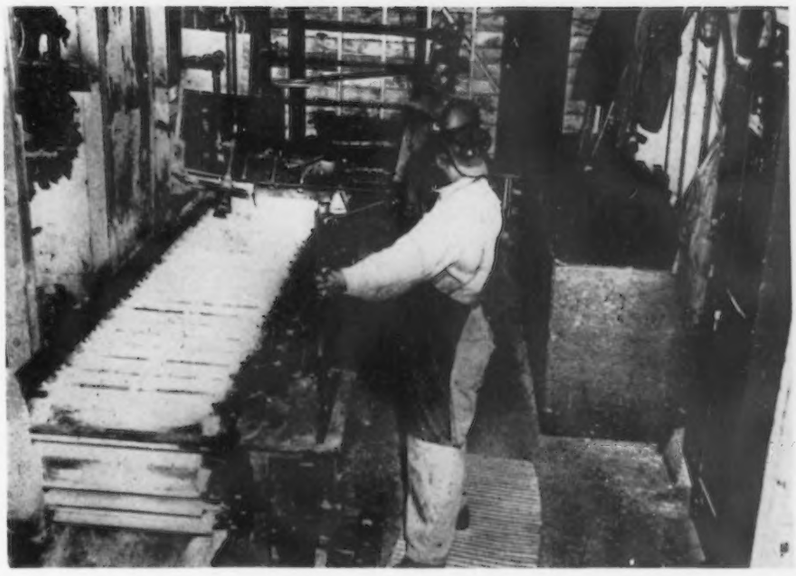




• • • **Similar** to its smelting operations at Jacksonville, Fla., the U. S. Navy is processing surplus aircraft into aluminum ingots at Alameda, Calif.

This is one of the steps in the Navy Dept.'s program of feeding aircraft back into commercial channels. Melting units have been installed in Jacksonville, Fla., Alameda and San Diego, Calif. Open pot furnaces are in operation at Miami, Fla.; Norfolk, Va., and Corpus Christi, Tex.

The entire program is designed to produce more than 35,000,000 lb of secondary aluminum ingots. These pictures indicate the aircraft scrap piles, the melting furnace and the resultant aluminum ingots.

This program is based on a careful breakdown of aircraft before smelting operations so as to minimize contamination of aluminum ingots by lead and other impurities. The operations are conducted on a mass production basis and scrap metals, not suitable for aluminum smelting and parts are carefully segregated for sale. Lead used as counterbalances is melted in simple furnaces and recovered as pig lead.

Large quantities of steel scrap result from the operations. Large aluminum cast parts are sold as such since the Navy realizes as much from scrap in this form as it does from aluminum ingot.

Industrial Briefs . . .

• APPRENTICESHIP GUIDE — In answer to the growing demand for a comprehensive explanation of how to establish an apprenticeship program and the procedures under the "G. I. Bill" when employing veterans as apprentices, Apprentice Training Service, U. S. Dept. of Labor, has issued a 30-page booklet entitled, "Setting Up an Apprenticeship Program—A Guide to Employers in Training Veterans for the Skilled Trades."

• TO REPRESENT—J. K. Mahaffey & Sons has been appointed representative of the Baker Industrial Truck Div., Baker Raulang Co., in the Pittsburgh area, succeeding Criss & Mahaffey.

• HEADS NEW FIRM — R. S. Ellinwood has been named president of a new firm, Ellinwood Industries, Inc., which will produce the Cat line of garden tractors under a license from Ellinwood Industries, Los Angeles.

• BUYS MACHINE COMPANY — Joy Mfg. Co., Pittsburgh, has completed a transaction for purchase of Breckenridge Machine Co. and will take over the plant immediately. Breckenridge Machine Co., which employs about 200 persons, builds special-purpose machine tools on order and specializes in high grade machining parts.

• LEASES PLANT — Electro-Motive Div. of General Motors has leased the Pullman airplane wing plant at 103rd St., and Cottage Grove Ave., Chicago, from the War Assets Administration. The present LaGrange plant will be known as Plant No. 1 and the leased building as Plant No. 2. The new structure has more than 600,000 sq ft of floor space and will be used for the fabrication of subassemblies. Approximately 2000 new jobs will be created, bringing the total employment of Electro-Motive to 11,500.

• UP FOR SALE—A calcium carbide and ferroalloy plant at Ashtabula, Ohio, leased and operated during the war by the Electro Metallurgical Co., has been offered for sale or lease by the War Assets Administration. The plant, which is offered for sale subject to rights of the operator now in possession, has an annual capacity of 88,000 tons of calcium carbide, and 36,000 tons of ferroalloys.

• NEW VULCAN DIVISION—Designed to meet the great demands of peacetime construction the Vulcan Iron Works of Wilkes Barre, Pa., has established its new Cement, Lime and Allied Products Div., under the leadership of Mark R. Woodward and Leon D. Holden.

• NEW SALES ORGANIZATION — The new organization of R. L. Karr & Co., Inc., has been formed for the sale of metal products, with headquarters at 8 S Michigan Ave., Chicago 3. The telephone number is State 8352.

• SALES OFFICES OPENED—Link-Belt Co., manufacturer of materials handling and mechanical power transmission machinery, has opened three new sales offices. The office in Moline, Ill., is located at 1608 Fifth Ave; the one in Cincinnati is at 730 Temple Bar Bldg., Main and Court Sts.; and the one at Birmingham is located at 823 Comer Bldg., 2100 Second Ave. N.

• ACQUISITION—Blaw-Knox Co. has announced that it has acquired the assets and business of Buflovak Northwest Co., Minneapolis. Buflovak Northwest specializes in the manufacture and sale of evaporating and drying equipment for use by dairies, flour mills and other food processors. Blaw-Knox will operate the newly acquired company as a wholly-owned subsidiary under the name of Buflovak Midwest Co. There will be no change in management or personnel.

Say Ore Outlook Good Despite Strike Threat

Cleveland

• • • **Possible tie-up of iron ore** shipping on the Great Lakes, as an offshoot of the National Maritime Union dispute, and any immediate curtailment of steelmaking operations as a direct result, were discounted by competent observers here.

According to Lake Superior Iron Ore Assn. figures, stocks on hand at furnaces and Lake Erie docks May 1, totaled 23,078,000 gross tons. Current loadings up to June 3 add 4,884,000 gross tons, bringing the total to 27,962,000 gross tons. Deducting May consumption of 5,300,000 gross tons, stocks on hand June 1 amounted to about 22,662,000 gross tons, about 2,000,000 tons higher than the June 1, 1945, total.

According to sources in the trade, if there were no iron ore movement on the Great Lakes for six weeks, and if June consumption were in the neighborhood of 6,000,000 tons, most consumers would be able to maintain an active immunity. Some are rather well fortified with stocks on hand, but a few, it was pointed out, do not have their ore stocks in the right spots for such famine.

In the event of a six weeks' strike it follows that stocks on hand July 1 would total about 16,600,000 tons. However, iron ore stocks on hand have been down this low in the past, and reached approximately this point on May 1, 1941.

Informed observers point out, however, that some shifting of tonnage is usually necessary when stocks get below two and one-half months supply. Thus, if the iron ore inventories were in the neighborhood of 13,500,000 gross tons by the middle of July, they would be too low for equitable distribution.

Canadian WAC Reports

Montreal

• • • **War Assets Corp.**, the government owned company, formed to dispose of Canada's surplus war materials and equipment, for the fiscal year ended March 31, 1946, sold materials to the value of $124,878,368.

Construction Steel...

Washington

• • • **Award of a contract** for two 350-ton overhead traveling cranes to the Morgan Engineering Co., Alliance, Ohio, has been authorized by the Dept. of the Interior. The cranes, to be delivered to the government at a net cost of $264,-237.27, will be installed in the Grand Coulee power plant of the Columbia Basin Project in the state of Washington.

• • • **Fabricated steel awards** this week included the following:

3300 Tons, Newark, N. J., vertical lift bridge over the Passaic River, for New Jersey Highway Dept., low bidder, Mt. Vernon Bridge Co., $1,532,454; American Bridge Co., $1,555,155.

2500 Tons, Redondo, Calif., steam generating plant, Southern California Edison Co. to Consolidated Steel Corp.

2350 Tons, Lambert's Point, Va., Norfolk & Western Bridge, to Virginia Bridge Co., Roanoke, Va.

900 Tons, Long Beach, Calif., transit shed, Long Beach Harbor Dept., Spec. H.D. 21, through Peter Kiewit Sons' Co. to Columbia Steel Co.

500 Tons, Philadelphia, Gulf Oil Co. maintenance building, to Bethlehem Steel Co.

490 Tons, Kingman, Ariz., fixed wheel gates, Bureau of Reclamation, Denver, Spec. 1203, to American Bridge Co.

152 Tons, Kingman, Ariz., Davis Dam equipment, schedule 2 of Spec. 1203, Bureau of Reclamation, Denver, to McKiernan Terry Corp.

150 Tons, Indianapolis, generator booster house for Citizens Gas & Electric Co., to United Engineers & Constructors, Philadelphia.

135 Tons, Friant, Calif., two 30-ton gantry cranes for Friant Dam, Bureau of Reclamation, Denver, Spec. 1227, to Cyclops Iron Works.

• • • **Fabricated steel inquiries** this week included the following:

2900 Tons, Pensacola, Fla., building, Alabama Pulp & Paper Co.

1500 Tons, Plaster City, Calif., U. S. Gypsum Co., buildings.

1000 Tons, Bartow, Fla., International Minerals & Chemicals Corp., mill buildings.

300 Tons, Herrin, Ill., Freeman Coal Co., coal processing plant.

285 Tons, Chicago, Chicago & Southern Airlines, hangar.

150 Tons, Newport, Vt., state bridge.

• • • **Reinforcing bar awards** this week included the following:

235 Tons, Boston, Boston University science building to Concrete Steel Co.

• • • **Reinforcing bar inquiries** this week included the following:

3520 Tons, New York, Jacob Ries housing.

3210 Tons, New York, Brooklyn Battery Tunnel, Manhattan approach.

3000 Tons, Idlewood, N. Y., municipal airport.

1300 Tons, Erie-Chautauqua, N. Y., paving and bridges.

1200 Tons, Parma, Ohio, building, General Motors Corp.

1080 Tons, Long Beach, Calif., bridge over Los Angeles River and Freeway, to City Manager, Long Beach, bids to open July 8.

895 Tons, Allegheny County, Pa., highway work.

800 Tons, Park Brook, Ohio, building, General Motors Corp.

500 Tons, Allegheny County, Pa., Pitt Parkway.

435 Tons, Tucumcari, N. M., miscellaneous bars, Bureau of Reclamation, Denver, Inv. A-32,993-A.

380 Tons, Granite City, Ill., Chain of Rocks Bridge, bids to U. S. Engineer.

245 Tons, Los Angeles, Santa Ana Parkway overcrossing at Boyle Ave., to California Div. Highways, Los Angeles, bids open July 5.

240 Tons, San Gabriel Canyon, Calif., alterations to facing of San Gabriel Canyon Dam No. 2, County Supervisors, Los Angeles, bids open July 9.

200 Tons, Los Angeles, Santa Ana Parkway undercrossing at Soto St., to California Div. Highways, Los Angeles, bids open July 5.

150 Tons, Pennhurst, Pa., male and female ward buildings.

140 Tons, Granby, Colo., miscellaneous bars, Bureau of Reclamation, Denver, Inv. F-46,181-A.

120 Tons, San Diego, Calif., Balboa Parkway undercrossing at 6th St., to California Div. Highways, Los Angeles, bids open July 5.

100 Tons, San Diego, Calif., Balboa Parkway overcrossing at Pascoe St., to California Div. of Highways, Los Angeles, bids open July 5.

100 Tons, Glen Lake, Minn., Hennepin County School for Boys.

• • • **Plate awards** this week included the following:

600 Tons, Jamaica, (export) penstock to Walsh Holyoke Boiler Works through Stone & Webster Engineering Corp.

Due to Coal Shortage French May Convert Openhearths to Oil

Paris

• • • **Recommendations have been** given by the French government to steel firms here for the use of increased amounts of fuel oil in openhearth furnaces in place of producer gas made from coal. Supplies of fuel oil are expected to be obtained from the United States and the Middle East. The cost of American fuel oil delivered in France is said to compare favorably with the cost of American coal so delivered.

Efforts are being made to draw up long-term contracts to assure future supplies at the same favorable terms. The French Ministry of National Economy is assisting in these efforts. The use of fuel oil is particularly interesting to French steelmakers in the north district, which have a higher proportion of openhearth furnaces than the eastern works.

The possible use of fuel oil is of particular interest to the steel industry of France as openhearth steel production in April reached 77 pct of the average of 1938 compared with only 49 pct for basic bessemer steel. A high percentage of scrap charged into the openhearths aided materially in reaching the figure.

There is an ample supply of scrap available on the home market, and France may well decide to reverse her prewar position as a scrap exporter in favor of increased openhearth production. The normal determining factor in France on this question before the war was cost. In the thirties the country's process production was usually 65 pct basic bessemer, 30 pct openhearth, and 5 pct electric and crucible steel.

In 1929 the production of 10,-670,000 tons of steel ingots was divided as follows: 7,348,000 tons basic bessemer, 3,029,400 tons openhearth; in 1937, of the 8,712,-000 tons produced, 5,775,000 basic bessemer and 2,519,000 openhearth; and for the month of April 1946, on a total of 352,000 tons, 167,200 basic bessemer and 146,300 openhearth steel.

Set Up New Standards For Porcelain Enamel

Pittsburgh

• • • **Standard specifications** covering the manufacture of architectural porcelain enamel have been officially approved and adopted by the architectural division of the Porcelain Enamel Institute. The standards prescribe the materials and methods to be used in designing, fabricating and processing parts for architectural porcelain enamel.

With the rapid growth in the demand for porcelain enamel for construction purposes, architects have given recognition to its durability and beauty and to the design possibility inherent in its adaptability to form. However, they have been handicapped in their desires to utilize it more widely because of a lack of authoritative information on how to specify it to insure a high quality of manufactured product.

The standards of manufacture have been developed to meet this need, according to the committee. They assure a high quality of porcelain enameling, and will help promote public confidence in the serviceability of such structures.

MACHINE TOOLS

. . . News and Market Activities

Machine Tool Sales Good; Profits Down

• • • **While many machine** tool builders are making and selling more units than they did before the war, using 1939 business as a yardstick, the delicate balance between plant production and plant capacity has been brought into sharp focus by strikes and shortages of materials, stemming from supplying industries with the result that some segments of the machine tool industry may have a battle on their hands to show a profit for 1946.

For some companies, 1946 thus far has not been a very profitable year, although there is no dearth of new firm orders evidenced by the industry's backlog which is in the immediate vicinity of $180,000,000. But there have been shutdowns and curtailments of various sorts which, along with shortages, have prevented many machine tool builders from utilizing the excess capacity resulting from wartime expansions.

It is reasonably apparent that none of the machine tool builders are going out of business within the next year or so, but at the same time, excess capacity is a factor with which they will eventually have to come to terms. It was this capacity which produced a substantial portion of the present government-owned machine tool surplus, which in turn is now responsible for the fact that much of the capacity is idle. Thus, the problem of many builders is to utilize wartime plant expansions in at least a manner which will prevent them from being a millstone until production generally is reflected in machine tool demand.

At the present time, if there is a demand for 400 machine tools of a given type, the manufacturer gets orders for 100 and the War Assets Administration receives orders for 300, according to a competent observer, who posed the question of what will happen to the manufacturer when a hypothetical demand exists for 200 units of a given type instead of 400. Where will the customer's dollar go?

Some sources believe that of the absorbable surplus, 40 or 50 pct is off the market and that there is no reason for any particular item such as lathes to be in short supply. The enormity of the task has doubtless had a great deal to do with the slowness of some of the surplus in coming out and may explain the reported shortages of some items as well. In any event, builders and dealers alike are going to have to live with the surplus for another 2 yr at least, and accordingly, it must be considered a predatory intangible factor in any long range plans at this time.

In the Detroit area, machine tool sales volume appears to be slightly off and substantial losses to surplus in the standard general purpose machine tool category are reported. Automobile companies have already satisfied any requirements for such equipment they might have; present buyers are reported to be smaller producers who wish to take advantage of substantial government discounts even though they sometimes find additional expenditures are necessary to make the equipment serviceable.

With 1946 production disappointing in the first half, buyers of special tools are abandoning efforts to install labor - saving equipment for use on 1946 models and are now concentrating on tooling for 1947 cars, according to reports.

The situation with respect to presses has eased somewhat in the Detroit area with entrance of new suppliers in the field. Several large press installations have been scheduled for delivery early in 1947, but shortages have definitely limited production and forecasts on future deliveries are always uncertain. One quotation on electric motors received by a Detroit manufacturer called for delivery in 44 months.

In Boston, the average best showing in new tool sales this year is around 75 pct of those for the first four months of 1945. From that level they drop to 50 pct and in a few instances even more. Those segments of the industry making the best showing report February the best month this year. Succeeding months have been progressively poorer, but February business was sufficiently good to temper the drop.

Number of orders on manufacturers books vary considerably. Some are accumulating stock, but many are on a 40-hr week operating basis and therefore not in an uncomfortable position.

In Cincinnati, most builders report that production is holding steady despite strikes. At a few companies, a shortage of electrical equipment is holding up production approximately 35 pct. Even though General Electric and Westinghouse workers are back on the job, the amount of material coming through is not yet sufficient for builders here. With the possibility of a Maritime strike, a new and particularly painful headache has been added, since a large portion of new business is foreign and many sources in the Cincinnati area have indicated that foreign business is in excess of 60 pct of all production.

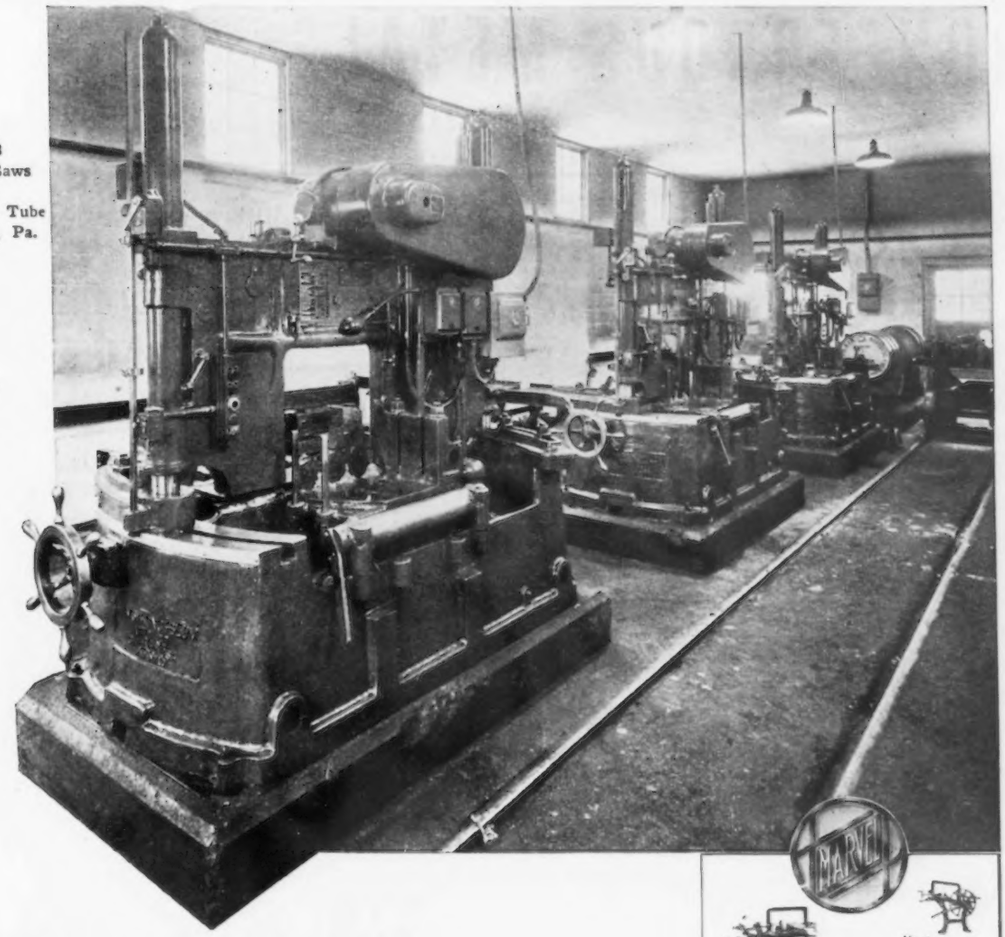
•

French Press Delivery Of All Machine Tools

Paris

• • • **Within the past** 12 months the French industry has produced 15,000 metalworking machines and 5000 woodworking machines, but pressure for even greater deliveries continues strong. It is expected that the successful conclusion of the French loan may make it possible to arrange an expanded import program, and efforts are still going on to obtain additional German tools as reparations.

The latest estimate of the age of the 550,000 to 590,000 metalworking machines in the French industry is 27 to 30 yr. A recent official survey of the French industry shows that there are 374 machine tool manufacturers in France, 238 of them manufacture metalcutting machines and 162 manufacture metalforming machines. These figures include 26 works belonging to both groups.



3 MARVEL #18 Hydraulic Hack Saws at the Babcock & Wilcox Tube Co., Beaver Falls, Pa.

EASILY CUT-OFF TOUGHEST STEELS

Steels just don't come too tough for MARVEL Giant Hydraulic Hack Saws. Take, for example, the three No. 18 MARVEL Saws, at the Babcock & Wilcox steel mill, shown above. These machines are used to cut test specimens from sample pieces of stainless and other tough alloy billets which are checked for seams, pipes, etc., before being drawn into tubing. It takes tough steel to make the best tubing, and it takes modern sawing equipment to cut it rapidly, accurately and economically.

With 10 types of metal-cutting saws, each available in a series of variations, MARVEL can furnish sawing machines that exactly meet your requirements. If you have a metal-sawing problem—call in the local MARVEL Sawing Engineer.

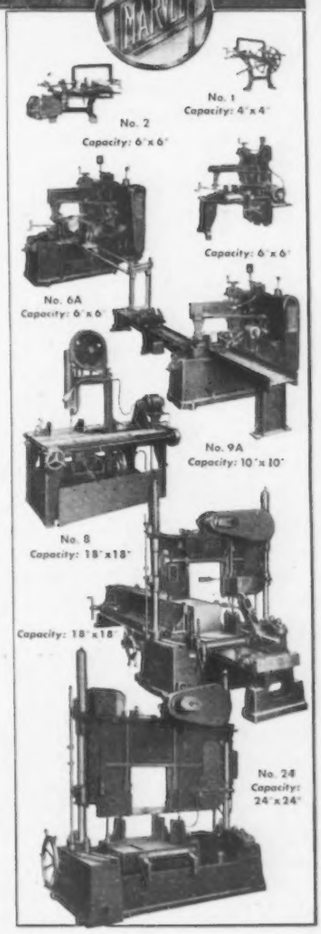
Write for MARVEL Catalog or check it in your Sweet's Catalog Files

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. **Chicago 39, U. S. A.**

***Eastern Sales Office:* 225 Lafayette St., New York 12, N. Y.**



MARVEL SAWS

NONFERROUS METALS

. . . News and Market Activities

Price Increased On Nonferrous Castings

Washington

• • • **Increase in maximum** prices of copper and copper-base castings to offset the price increases of metals used has been announced by OPA. Producers of these nonferrous castings may increase prices at the same time their metal costs increase as a result of the June 1 pricing order.

Price increases for these castings, listed in cents per lb, are:

97 pct or more copper, 2½¢.
85-5-5-5 group (OPA No. 100-132, inc.), 2½¢.
88-10-2 group (OPA No. 193-257, inc.), 2¼¢.
80-10-10 group (OPA No. 295-326, inc.), 2½¢.
Yellow brass group (OPA No. 400-409, inc.), 2½¢.
Nickel alloys group (OPA No. 410-414, inc.), 1½¢.
Aluminum bronze group (OPA No. 415), 2¢.
Manganese bronze group (OPA No. 420-424, inc.), 1¢.
Silicon bronze group (OPA No. 500), 2¢.

•

Copper Wire Price Raised

Washington

• • • **Manufacturers have been** authorized to adjust automatically prices of copper wire and cable, copper-alloy and copper-clad wire and cable, and lead-covered wire and cable to cover dollar and cents increased costs resulting from metal price increases granted on June 3, OPA has announced in a follow-up order. The increases for lead-covered wire and cable became effective June 4 and for the other items, June 3.

•

Ferroalloys Decontrolled

Washington

• • • **Opa has suspended** price controls on a number of ferroalloys and metals, effective June 12. All of the items subject to several regulations are suspended. These are MPR 258—chrome ores, MPR 405—ferrosilicon and silicon metal, MPR 407—ferrochromium and chromium metal, and MPR 489—tungsten, molybdenum, vanadium, cobalt and certain other alloys and metals.

OPA says that, in general, the supply of these items is ample to meet the present demand and that situation should continue for the foreseeable future. In the case of some of these commodities no price increases are expected to result from the suspension of controls and it is reported that present market prices of several of these items are below ceilings.

•

Lead Increase Passed On

Washington

• • • **Effective as of June 3,** producers of metallic lead products made from lead or lead alloys are permitted to increase their base period freeze prices 1.75¢ per lb of lead contained in the product, OPA announces. The action compensates producers for a similar increase in base metal prices announced June 1.

Similarly, producers of copper base hardeners and deoxidizers, used in production of nonferrous castings, may raise prices 2.375¢ for each pound of copper contained in these products.

In addition to lead pipe and fittings, lead products affected include babbitt or bearing metal, solder, type metal, sheet, pipe, fittings, roofing flanges, shots, sinkers, tubings, wire and collapsible tubes. Lead chemicals, pigments and paints are not included.

•

CPA Allocates Lead Oxide

Washington

• • • **Allocation controls** on lead oxide will be established by CPA as of July 1 has been announced. In addition, the amended M-38 order establishes quotas for manufacture of essential civilian ammunition, permitting use of lead in plumbing waste and vents, and use of lead foil in ammunition components for both military and civilian use.

CPA indicates that its original 850,000 tons supply estimate for 1946 will have to be sharply revised downward. Largely because of strikes, the current production rate is less than half the normal half-million ton annual production. Declining imports and scrap supply further aggravate the situation, it was said.

•

Surplus Copper Action

Washington

• • • **At the request** of CPA, WAA has revoked its Order 3, SPA Reg. 17, which permitted owning agencies to make direct sales of surplus copper and copper-base alloy scrap. Under CPA's Direction 19, PR 13, the WAA will sell these products only as directed by CPA which will channel them to buyers who certify that the proposed purchase will not bring their inventories above the 90-day level. Purchasers for resale may buy upon showing that the goods will be immediately offered on the market.

•

OMR Raises Copper Price

Washington

• • • **Under an OPA order,** effective June 4, a maximum base price for sales of copper by the Office of Metals Reserve has been fixed at 14⅜¢ per lb when delivered to Connecticut Valley points in carload lots. For less than carloads, the price is set at 14½¢ per lb.

At the same time, OPA raised to 14½¢ per lb the maximum base price of less than carload lots of electrolytic, lake and other fire refined copper originating at mines which have granted approved wage increases and delivered to Connecticut Valley.

•

Lead and Silver Gains

Ottowa

• • • **Canadian production** of lead and silver registered gains in the first two months of this year over 1945, but zinc output was down. Lead output for the two months totaled 64,546,294 lb, against 40,201,755 lb. Production of silver amounted to 2,249,954 oz against 1,971,815 oz. Zinc production in the two months at 81,518,332 lb was down from the 94,026,765 lb for 1945.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (Min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake	14.375
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$110.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$101 to $103
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$56.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Zirconium copper, 6 pct Zr, per lb contained Zr	6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	11.00
Aluminum, deoxidizing Nos. 2, 3, 4	9.50 to 11.25
Brass Ingot	
85-5-5-5 (No. 115)	15.50
88-10-2 (No. 215)	18.75
80-10-10 (No. 305)	18.25
No. 1 Yellow (No. 405)	12.50

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	22.10	....	22.08
Copper, H.R.	....	18.60	....
Copper drawn	....	19.60	....
Low brass, 80%	....	21.43	20.81
High brass	....	....	21.48
Red brass, 85%	....	21.64	21.69
Naval brass	21.40	20.15	25.83
Brass, free cut	....	16.04	....
Commercial bronze, 90%	....	22.35	22.40
Commercial bronze, 95%	....	22.56	22.61
Manganese bronze	25.10	....	29.33
Phos. bronze, A, B, 5%	....	39.02	38.77
Muntz metal	21.15	19.90	24.08
Everdur, Herculoy, Olympic or equal	....	26.53	27.33
Nickel silver, 5%	....	30.80	28.62
Architect bronze	20.15	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢, 52S-O, 67¢ 24S-T, 71¢: base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

(Continued, See Next Column)

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb, f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable	....*
Lead covered telephone, power cable	....*
Insulated copper	....*

OPA Group 2†

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids	....*
Low lead bronze borings	....*
Babbitt lined brass bushings	14.75
High lead bronze solids	....*
High lead bronze borings	....*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings	12.25
Tinny (phosphor bronze) solids	12.25
Copper-nickel solids and borings	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition)	10.75
Soft red brass borings (No. 1)	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids	10.25
Unlined standard red car boxes	10.00
Lined standard red car boxes	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors	7.75
Manganese bronze solids	8.00[1]
Manganese bronze solids	7.00[2]
Manganese bronze borings	7.25

OPA Group 4

Refinery brass	6.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose	9.625
Loose yellow brass trimmings	9.625

Aluminum*

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	5.00 to 5.50
turnings, dry basis	3.50 to 4.00
Low copper, alloys 51, 52, 61, 63S solids	7.00 to 8.00
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	5.25
Turnings, dry basis	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.50
Old castings and forgings	6.00
Pistons, free of struts	5.00
Pistons, with struts	4.50
Old alloy sheet	3.00 to 4.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for soft and hard lead including cable, for f.o.b. point of shipment price.

Soft lead scrap	6.50

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25⅛
Electrodeposited	18⅞
Rolled, oval, straight	19⅝
Curved	20⅜
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80¾

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.655
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

Low Industrial Activity Retards Scrap

New York

• • • **Conflicting views** on the prime cause of the scrap shortage are rife throughout the trade this week though all are agreed that the situation is indeed acute. Some authorities, notably in Pittsburgh and Buffalo, maintain that a price increase is needed all along the line. Others contend that the market will right itself when steel production permits plants to generate sufficient scrap.

Competent observers here are inclined to believe that a price increase in remote scrap and cast iron might be of some benefit, but feel that no real improvement can be expected until industrial scrap begins to move in greater quantity.

•

Pittsburgh

• • • **Scrap shipments** are far below normal and mills are digging into small inventories to get steel production back to normal. It will take a few weeks before iron output is up to normal, but in the meantime mills are making cold metal openhearth charges. For the first time in several months, one buyer here is going afield for low phos scrap, paying up to $2.50 a ton springboard. Unprepared ship scrap is coming into this district, but the spread between cost and ceiling selling price is not very great. This scrap costs between $19 and $20 a ton delivered in the yard at Pittsburgh, to which must be added preparation charges. The low phos ceiling on this grade, $22.50 less switching charge, is not high enough to cover preparation costs. Most of the material is large sections, and much of it has to be cut. Observers feel that the cost of such preparation runs up to $3.50 to $4.00 a ton.

•

CHICAGO—Shortage of scrap at district steel mills has become so critical that it is holding down steel making operations. With coal supplies mounting rapidly, scrap now is the most important factor depressing operations. With the question of increased prices in the wind, some mills are so desperate for material that they tend to view the proposed increase tolerantly. Opinion is divided in the trade, however, as to whether an increase would bring out more material.

•

PHILADELPHIA—Mills report scrap receipts poor. Those mills that closed down for a week continued to accept shipments during that time. Pig iron supplies are reported inadequate but local buyers are optimistic about reports that coal is coming out of the mines faster than had been anticipated. The replacement of diminished pig iron shipments by scrap is out of the question at this time.

Pittsburgh

• • • **E. N. Dettig has been appointed head of the newly opened Pittsburgh office of the Luria Steel & Trading Co. The new office, located at 324 Fourth Ave., Pittsburgh, will represent the company in this area in both the purchase and sale of scrap.**

•

DETROIT — Lists for June just released indicate that the volume of scrap available in the Detroit area will be about the same as for May. Dealer collections continue to fall off and are considerably below normal. There are reports that some dealers, anticipating a higher price for scrap with a loosening of OPA regulations, are starting to stockpile but there are no indications that this practice is at all general. As a matter of fact, the argument has been put forward that in the event prices are raised, grading regulations will be tightened up, nullifying at least in part the benefits to be derived from stockpilling.

•

BOSTON — Scarcity of cast and low phos will force more foundry closings and cuts in operating schedules within a week or ten days. Yards and brokers report little heavy melting steel available and will not hazard an estimate comparison of shipments this and last year.

•

BIRMINGHAM—There is little change from the heavy demand and short supplies of the past several weeks. Renewed capacity pig iron production following the end of the coal mine strike has not materially eased the extreme tightness of cast iron grades.

•

BUFFALO—Scrap circles hummed this week with talk of higher ceilings, while business lagged and consumers fretted about supplies. Dealers asserted some feeder yards had aggravated the shortage by holding back shipments in anticipation of OPA action along this line. One leader voiced the opinion that a boost of at least $5 a ton would be necessary to achieve the desired results.

CINCINNATI — Demand continues strongly in excess of available material. Brokers and dealers have only a faint hope that the cessation of the railroad strike may bring out more tonnage and are still trying to spread the thin supply over the huge demand. Quality is poor but melters are taking all they can get.

•

CLEVELAND—As usual, demand tops supply by a wide margin. Mills are continuing their efforts to earmark shipments to plants which have promised to return the favor in the form of scrap. Dealers are still moving some No. 2 bundles. Observers see slight chance of improvement for the next few weeks because so many of the plants which generate scrap are shut down due to the steel shortage.

•

ST. LOUIS—With the largest user of scrap iron in the St. Louis industrial district down and shipments to it withheld, material intended for this market is going to other centers. Other consumers are said to be comfortably situated, but willing to take on additional scrap. The only shortage is in cast iron foundry grades.

•

TORONTO — Critical shortage with steadily expanding demand are features of the Canadian market. Dealers report limited receipts and yard stocks sufficient to keep processing crews busy for a few days. Most of the material is of the lighter grades and requires baling. Only occasional deliveries of the better grades of scrap are appearing on the market. The chief reason for the shortage is the fact that industrial plants are operating at only a fraction of capacity and scrap from this source is negligible.

•

Dealers Oppose Price Rise

Chicago

• • • **Opposition to any** increase in scrap price ceilings, and support for continuation of the OPA, has been unanimously voted by the Association of Iron & Steel Dealers of Chicago. A resolution voted by the group supports the belief that a price rise would not bring out more scrap.

Opinion is divided on the question of a price rise among brokers and consumers. It is generally conceded that a rise would not bring out more production scrap, but some buyers feel that additional country scrap could be obtained which would tide over consumers until production scrap again is available. This view is refuted, however, by scouts who have scoured remote areas for material without success, and who declare that the scarcity is not tied with prices.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting		$19.50*
No. 2 hvy. melting		19.50*
No. 1 bundles		19.50*
No. 2 bundles		19.50*
Mach. shop turn.	$10.50 to	11.00
Shoveling turn.	12.50 to	13.00
Cast iron borings	11.50 to	12.00
Mixed bor. & turn.	11.50 to	12.00
Low phos. plate		22.00*
No. 1 cupola cast.		20.00*
Hvy. breakable cast.		16.50*
Stove plate		19.00*
Scrap rails		21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting		$15.05*
No. 2 hvy. melting		15.05*
Nos. 1 and 2 bundles		15.05*
Busheling		15.05*
Turnings, shovelings		12.05*
Machine shop turn.		10.05*
Mixed bor. & turn.		10.05*
Cl'n cast, chem. bor.	$13.06 to	14.15*

Truck delivery to foundry

Machinery cast.	21.00 to	23.51*
Breakable cast.	21.57 to	21.87*
Stove plate	20.00 to	23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast.	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting		$17.00*
No. 2 hvy. melting		17.00*
No. 2 bundles		17.00*
No. 1 busheling		17.00*
Long turnings		12.00*
Shoveling turnings		14.00*
Cast iron borings		13.00*
Bar crops and plate	$18.50 to	19.50*
Structural and plate	18.50 to	19.50*
No. 1 cast		20.00*
Stove plate		19.00*
Steel axles		18.50*
Scrap rails		18.50
Rerolling rails		20.50*
Angles & splice bars	20.50 to	21.00
Rails 3 ft. & under		21.00*
Cast iron carwheels	17.50 to	18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting		$18.00*
No. 1 hvy. melting		17.00*
No. 2 hvy. melting		17.00*
No. 2 bales	$15.00 to	15.75
No. 3 bales	8.50 to	9.25
Mach. shop turn.	6.50 to	7.25
Elec. furn. 1 ft. und.	15.50 to	17.00
No. 1 cupola cast	19.00 to	21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting		$17.00
No. 2 hvy. melting		17.00
No. 1 bales	$16.00 to	16.75
No. 2 bales	15.00 to	15.75
No. 3 bales	8.00 to	9.00
Mach. shop turn.		7.00
No. 1 cupola cast.	19.00 to	21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting		$14.50*
No. 1 & No. 2 hvy. melting		14.50*
Elec. furn. 1 ft. und.	$14.00 to	15.00
No. 1 cupola cast		20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	June 11, 1946	June 4, 1946	May 7, 1946	June 12, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.25	$5.25	$5.25	$5.00
Tinplate, electro (0.50 lb)	4.75	4.75	4.75	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.65
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.25	3.25	3.25	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00
Light rails	49.18	49.18	49.18	45.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*: (per gross ton)	June 11, 1946	June 4, 1946	May 7, 1946	June 12, 1945
No. 2 foundry, Phila.	$28.34	$28.34	$28.34	$26.84
No. 2, Valley furnace	26.50	26.50	26.50	25.00
No. 2, Southern, Cin'ti	26.94	26.94	26.94	25.44
No. 2, Birmingham	22.88	22.88	22.88	21.38
No. 2 foundry, Chicago†	26.50	26.50	26.50	25.00
Basic, del'd eastern Pa.	27.84	27.84	27.84	26.34
Basic, Valley furnace	26.00	26.00	26.00	24.50
Malleable, Chicago†	26.50	26.50	26.50	25.00
Malleable, Valley	26.50	26.50	26.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.
*Subject to retroactive adjustment by OPA.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.50
Foundry coke, prompt	9.00	9.00	9.00	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	14.375	12.00	12.00	12.00
Copper, Lake	14.375	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 11, 1946	2.72115¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One week ago	2.72115¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One month ago	2.72115¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One year ago	2.42471¢ per lb.	$24.61 per gross ton	$18.92 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.72115¢ Apr. 2	2.54490¢ Jan. 1	$26.12 Mar. 19	$25.37 Jan. 1	$19.17	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

NEOCETA BRUSHES

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WEARS LIKE PURE HOG BRISTLE

HOLDS JUST THE RIGHT AMOUNT OF PAINT

DOESN'T MAT OR FINGER

KEEPS ITS STIFFNESS IN PAINTS CONTAINING WATER

Brush Division
PITTSBURGH PLATE GLASS COMPANY

PPG

5 YEARS OF NATIONAL USE

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher. Alloy price increases are retroactive to Feb. 15.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14]) $39	$39	$39				$51[14]	$41		
Carbon, forging billets	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47	$47					$59[14]	$49		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$60.59		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS[15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢	(Worcester=2.40¢)					2.55¢	2.80¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.665¢	2.595¢
Cold-rolled[1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.515¢	3.595¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.29¢	4.22¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.16¢	4.12¢
Long ternes[2]	4.05¢	4.05¢	4.05¢									4.80¢		4.41¢	4.37¢
STRIP															
Hot-rolled[3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.81¢	2.77¢
Hot-rolled[3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.71¢	2.67¢
Cold-rolled[4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.41¢	3.37¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.91¢	
Commodity cold-rolled	3.20¢	3.30¢		3.20¢			3.20¢	(Worcester=3.60¢)					3.30¢	3.56¢	
TINPLATE															
Standard cokes, base box	$5.25	$5.25	$5.25		$5.35			$5.35	$5.35					$5.60[11]	$5.53[11]
Electro, box 0.25 lb	$4.60	$4.60	$4.60					$4.70							
Electro, box 0.50 lb	$4.75	$4.75	$4.75					$4.85	$4.85						
Electro, box 0.75 lb	$4.90		$4.90					$5.00	$5.00						
BLACKPLATE															
29 gage[5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢						3.57¢
TERNES, MFG.															
Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.82¢
Rail steel[6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet)[7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.59¢	2.67¢
Reinforcing (rail)[7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		2.57¢
Cold-finished[8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.42¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem Massillon, Canton=2.92¢)					3.03¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.73¢		
PLATE								(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)							
Carbon steel[13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.69¢	2.55¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.11¢	4.07¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.27¢	4.49¢		4.00¢	3.88¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.52¢	2.465¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.20¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE[9]															
Bright[12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.55¢			3.37¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢)					4.50¢			4.32¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢			2.97¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.25	$3.75
Coated nails	3.25	3.75
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50c a ton.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
NE 8600	0.676¢	$13.52	1.196¢	$23.92
NE 8700	0.728	14.56	1.248	24.96
NE 9400	0.780	15.60	1.300	26.00
NE 9700	0.676	13.52	1.196	23.92
NE 8800	1.352	27.04	1.872	37.44
NE 9900	1.248	24.96	1.612	32.24

The extras shown are in addition to the base price of $2.92 per 100 lb on finished products and $58.43 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.27¢ per lb for bars and bar-strip and $5.14 per gross ton for billets, blooms and slabs. Alloy price increases are retroactive to Mar. 1.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

½-in.	17⅞	+4⅜
¾-in.	24¼	2⅝
1-in. and 1¼-in.	28⅝	9¼
1½-in.	33	11⅞
2-in.	32⅜	11⅜

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅜
4½-in. to 8-in.	27	10¼

Steel (butt, extra strong, plain ends)

½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

½-in.	18⅞	+1⅝
¾-in.	25⅜	4¾
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28⅛	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅜	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft or 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....$60.80
6-in. and larger, del'd New York... 60.20
6-in. and larger, Birmingham..... 52.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle 74.00

For all rail shipment; rail and water shipment less.

Class "A" and gas pipe, $3 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 7 pct applies to all listings.

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter...65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes 62
Plow bolts 65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger 56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer

Packages, nuts loose .....71 and 10
In packages 71
In bulk 80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets
(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws

Percent Off List Consumer

Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in..... 64
Upset set screws, cup and oval points 71
Milled studs 46
Flat head cap screws, listed sizes..... 36
Fillister head cap, listed sizes..... 51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more $33.00	
65% but less than 70%.....	32.00
60% but less than 65%.....	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

Per Gross Ton

Old range, bessemer, 51.50..... $4.95
Old range, non-bessemer, 51.50.... 4.80
Mesaba, bessemer, 51.50 ..... 4.70
Mesaba, non-bessemer, 51.50 ..... 4.55
High phosphorus, 51.50 ..... 4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Brass, minus 100 mesh ...18.5¢ to 20.25¢
Copper, electrolytic, 150 and 200 mesh .....21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh .....20½¢ to 25½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....11¢ to 16¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots..... 4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots ..... 63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.27¢ to 42¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 31¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe..... 90¢
Aluminum, 100 and 200 mesh..... *25¢
Antimony, 100 mesh ..... 30¢
Cadmium, 100 mesh $1.40
Chromium, 100 mesh and finer.... $1.25
Lead, 100, 200 & 300 mesh....11½ to 15¢
Manganese, minus 325 mesh and coarser .....44¢ to 61¢
Nickel, 150 mesh ..... 51½¢
Silicon, minus 325 mesh and coarser .....26¢ to 55¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh ..... 58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb.. $2.60
Under 100 lb..... $3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, deld	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis.....$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio 60.40
First quality, New Jersey 65.90
Sec. quality, Pa., Md., Ky., Mo., Ill. 54.80
Sec. quality, New Jersey 57.70
Sec. quality, Ohio 52.95
Ground fire clay, net ton, bulk..... 8.95

Silica Brick*

Pennsylvania and Birmingham... $60.40
Chicago District 69.30
Silica cement, net ton (Eastern)... 10.60

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Plymouth Meeting, Chester $54.00

Magnesite Brick

Standard, Balt. and Chester.....$76.00
Chemically bonded, Baltimore..... 65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads) $43.48
Domestic, f.o.b. Chewelah, Wash. in bulk 22.00
in sacks 26.00

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, NE 8617-20	Hot-Rolled, NE 8742-50 Ann.	Cold-Drawn, NE 8617-20	Cold-Drawn, NE 8742-50 Ann.
**Philadelphia	$3.743	$5.087	$5.218a	$4.272	$4.172	$5.022	$3.855	$3.916	$4.072	$4.522	$6.016	$7.218	$7.372	$8.522
New York	3.815	4.838[3]	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston	3.999	4.969[9]	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore	3.619	5.077	5.344	4.252	4.152	....	3.844	4.009	4.052	4.502	....	....	....	....
Norfolk	3.996	....	5.821	4.515	4.415	....	4.221	4.252	4.315	4.615	....	....	....	....
Chicago	3.475	4.425	5.581	3.95	3.85	4.90[17]	3.80	3.80	3.75	4.20	....	....	....	....
Milwaukee	3.612	4.562[3]	5.537	4.087	4.077	5.037[17]	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland	3.575	4.625	5.327	3.95	3.85	4.70[17]	3.65	3.838	3.60	4.20	6.006	....	6.95	....
Buffalo	3.575	4.625	5.104/5.20	4.169	4.069	4.919	3.88	3.65	3.60	4.20	5.80	6.90	7.95	8.00
Detroit	3.675	4.725	5.45	4.05	3.95	....	3.859	3.911	3.70	4.25	6.13	....	7.259	....
Cincinnati	3.65	4.70[3]	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	....	7.311	....
St. Louis	3.622	4.572[3]	5.581	4.097	3.997	5.181[17]	3.947	3.947	3.897	4.481	6.181	....	7.331	....
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	5.80	6.90	6.95	7.95
St. Paul	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	....	....	....	....
Omaha	4.018	5.668	5.965	4.343	4.243	....	4.343	....	4.293	4.893	....	....	....	....
Indianapolis	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	....	7.28	....
Birmingham	3.675	....	5.20	....	....	....	3.80	3.80	3.75	4.903	....	....	....	....
Memphis	4.19	4.885	5.715	4.565	4.465	....	4.315	4.315	4.265	4.78	....	....	....	....
New Orleans	4.283*	5.304	5.808	4.658	4.558	....	4.408	4.408*	4.358*	5.079	....	....	....	....
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	4.70/5.00	6.80/7.20[3]	6.55	4.95	4.85	....	4.60/4.95	4.45/4.65	4.40/4.55	5.683/6.03	....	....	....	....
San Francisco	4.12	6.87	6.35	4.60	4.50	4.15	4.15	....	4.30	5.78	....	....	....	....
Seattle	4.87[12]	7.27[4]	6.40	4.60	4.50	....	5.00[12]	4.70[12]	4.60[12]	6.23	....	....	....	....
Portland	4.87[11]	6.82[4]	6.20	5.10	5.00	....	5.00[11]	4.70[11]	4.70[11]	5.98	8.15	....	9.20	....
Salt Lake City	4.75	....	6.62[18]	5.88	5.78	....	5.23[18]	5.23[18]	5.13	6.35	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, subject to retroactive adjustment. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	27.00	27.50	28.00	28.50	....
Birdsboro	27.00	27.50	28.00	28.50	32.00
Birmingham	21.50	22.88	....	27.50	....
Buffalo	25.50	26.50	27.00	27.50	32.00
Chicago	26.00	26.50	26.50	27.00	....
Cleveland	26.00	26.50	26.50	27.00	....
Detroit	26.00	26.50	26.50	27.00	....
Duluth	26.50	27.00	27.00	27.50	....
Erie	26.00	26.50	27.00	27.50	....
Everett	27.00	27.50	28.00	28.50	....
Granite City	26.00	26.50	26.50	27.00	....
Hamilton	26.00	26.50	26.50	....	....
Neville Island	26.00	26.50	26.50	27.00	....
Provo	24.00	24.50	....	....	....
Sharpsville[1]	26.00	26.00	26.50	27.00	....
Sparrows Point	27.00	27.50	....	....	....
Steelton	27.00	....	....	....	32.00
Swedeland	27.00	27.50	28.00	28.50	....
Toledo	26.00	26.50	26.50	27.00	....
Youngstown	26.00	26.50	26.50	27.00	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	0.50	27.50	28.00	28.50	29.00	....
Boston	Birdsboro-Steelton	4.02	....	....	....	....	38.02
Brooklyn	Bethlehem	2.50	29.50	30.00	30.50	31.00	....
Brooklyn	Birdsboro	2.92	....	....	....	....	34.92
Canton	Clev, Ygstn, Sharpsvil.	1.39	27.39	27.89	27.89	28.39	....
Canton	Buffalo	3.19	....	....	....	....	35.10
Cincinnati	Birmingham	4.06	25.56	26.94	....	....	....
Cincinnati	Hamilton	1.11	....	....	27.61	....	....
Cincinnati	Buffalo	4.40	....	....	....	....	36.40
Jersey City	Bethlehem	1.53	28.53	29.03	29.53	30.03	....
Jersey City	Birdsboro	1.94	....	....	....	....	33.94
Los Angeles	Provo	4.95	28.95	29.45	....	....	....
Los Angeles	Buffalo	15.41	....	....	....	....	47.41
Mansfield	Cleveland-Toledo	1.94	27.94	28.44	28.44	28.94	....
Mansfield	Buffalo	3.36	....	....	....	....	35.36
Philadelphia	Swedeland	0.84	27.84	28.34	28.84	29.34	....
Philadelphia	Birdsboro	1.24	....	....	....	....	33.24
San Francisco	Provo	4.95	28.95	29.45	....	....	....
San Francisco	Buffalo	15.41	....	....	....	....	47.41
Seattle	Provo	4.95	28.95	29.45	....	....	....
Seattle	Buffalo	15.41	....	....	....	....	47.41
St. Louis	Granite City	0.50	26.50	27.00	27.00	27.50	....
St. Louis	Buffalo	7.07	....	....	....	....	39.07

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$32.00; f.o.b. Buffalo—$33.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed.

96-98% Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32¢
Ton lots	34¢
Less ton lots	36¢

Low-Carbon Ferromanganese

Contract price per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10 max. C, 0.06% P, 90% Mn	21.00¢	21.40¢	21.65¢
0.10% max. C	20.50¢	20.90¢	21.15¢
0.15% max. C	20.00¢	20.40¢	20.65¢
0.30% max. C	19.50¢	19.90¢	20.15¢
0.50% max. C	19.00¢	19.40¢	19.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Silicomanganese

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
Ton lots	6.70¢
Briquet, contract basis, carlots, bulk, freight allowed, per lb of briquet	5.80¢
Ton lots	6.30¢
Less ton lots	6.55¢

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

Contract price per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

Contract price per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination. 40% Si.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
Ton lots	3.80¢	4.20¢	4.25¢

Electric Ferrosilicon

Contract price per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	20.50¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

Briquets—contract price per pound of briquet, f.o.b. shipping point, freight allowed. 60% chromium.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	14.00	14.40	15.00
Ton lots	14.00	15.55	16.75
Less ton lots	15.40	16.05	17.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices per pound, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.85¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00¢	12.75¢	14.75¢
Less ton lots	12.50¢	13.25¢	15.25¢

Alloy 5: 50-56% Cr, 4-6% Mn, 13-50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	11.75¢	12.50¢	14.50¢
Less ton lots	12.25¢	13.00¢	15.00¢

SMZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00¢	12.85¢	14.60¢
Less ton lots	12.50¢	13.35¢	15.10¢

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carloads lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Canadian Government Suspects Black Market Sales of Nails to U.S.

Toronto

• • • **According to a report** emanating from Ottawa, there is strong official suspicion that the acute shortage of nails reported to be holding up Canada's construction program is being accentuated at least by smuggling operations across the border for black market sale.

Canada's nail production, described in the House of Commons by Reconstruction Minister Howe as going at full capacity, should be quite sufficient to meet even the increased Canadian demand. In fact in actual figures, Canada is consuming only a percentage of stocks which should be on hand. One clue to the situation is the demand from the United States coming through the legitimate channels, a demand which is blocked by refusal to issue export permits to fill the orders. One recent application was made for a permit to export a substantial shipment to the United States to be sold at $1 per lb. Other applications have quoted as high as $50 a keg. This compares with black markets in Canada running as high as $24 a keg. Retail prices for nails on the legitimate Canadian markets is about 8¢ a lb if available.

The present shortages are attributed to three main causes:

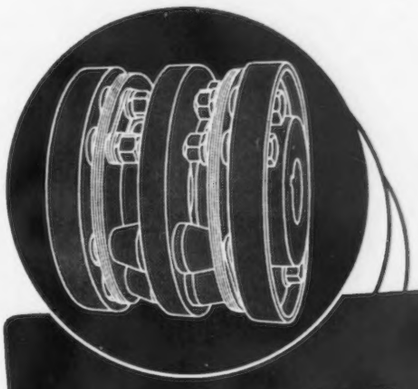
(1) Stockpiling by Canadian producers and distributors who are holding out in the hope of increased steel prices and a corresponding Prices Board adjustment in nail prices. The last increase was granted in March. This is believed to be the largest contributor to shortages.

(2) Black market operations in Canada, said to be quite extensive.

(3) Smuggling operations across the border to take advantage of American prices.

• • • **While it is a fact** that there is a serious shortage of nails in Canada, and many construction jobs are being held up through lack of nails, Canadian producers laugh at any suggestion that there is a black market in nails leading into the United States with prices of $1 per lb or $50 per keg. They point out, however, that production is far below capacity, chiefly due to shortage of wire rods. It also is understood

THOMAS
Flexible COUPLINGS
are specified by engineers wherever
100% dependability is demanded



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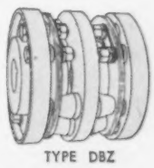
Flexible COUPLINGS
provide for
Angular and Parallel Misalignment as well as Free End Float . . .
and Eliminate
BACKLASH, FRICTION, WEAR and CROSS-PULL
NO LUBRICATION IS REQUIRED!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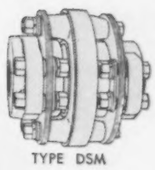
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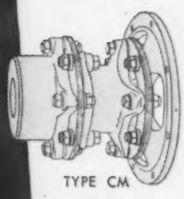
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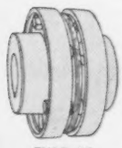
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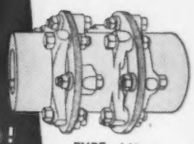
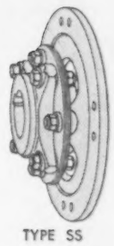

TYPE AM

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.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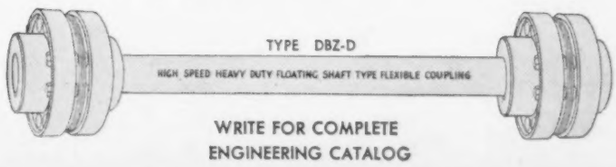
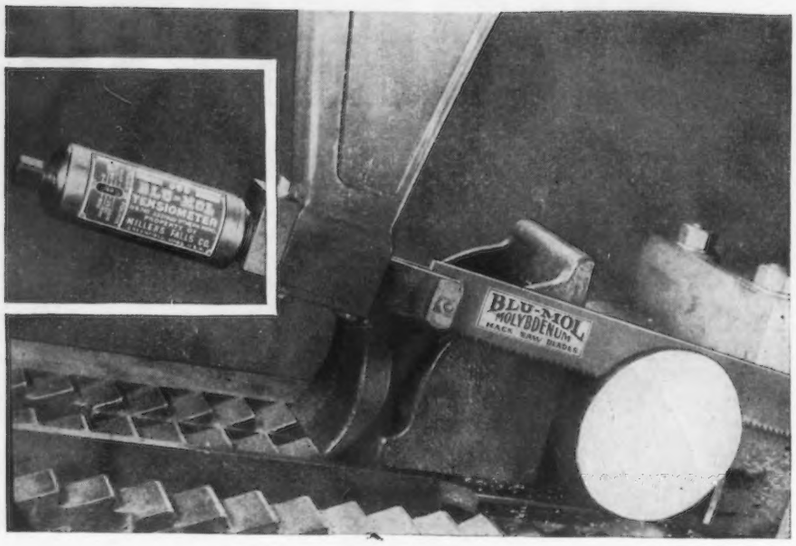


WRITE FOR COMPLETE ENGINEERING CATALOG

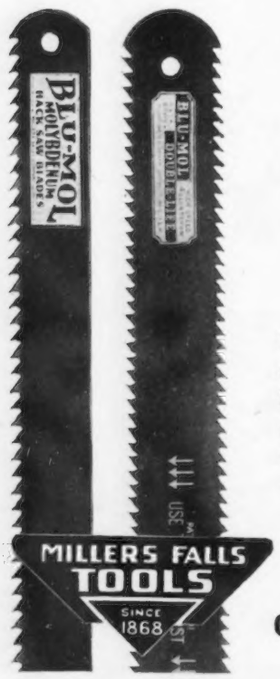
THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA



The New BLU-MOL "TENSIOMETER"

offers longer blade life, more accurate cutting

A small cylinder quickly attached to your hack saw machines, the Blu-Mol "Tensiometer" can effect substantial savings in time and money while making it easier for your plant to produce top-quality work. While acting as a shock absorber, the Tensiometer positively maintains any desired blade tension from 0 to 4,000 pounds. It has been proven that this controlled tension definitely:



1. Improves the accuracy of cut.
2. Compensates for the lengthening of the blade due to heating and eye elongation.
3. Absorbs shocks, minimizes blade breakage, prevents excessive wear.
4. Promotes faster cutting.
5. Greatly increases the cutting life of any blade.

Let us prove to *you* how much the Blu-Mol Tensiometer and Blu-Mol High Speed Molybdenum Blades, single or double edge, can improve efficiency in your plant. Just give us the name of the individual supervising metal sawing, the name of machines and sizes of blades used, and we will arrange a run right on your own machines that will show some surprising results.

One Thing in Common — *Quality!*

MILLERS FALLS COMPANY

GREENFIELD • MASSACHUSETTS

that production may be further curtailed in June, and the shortage may become even more acute. It is practically impossible to obtain nails at this time and even the small lots formerly available from retailers have dried up. It is further stated that there are no large stockpiles of nails either in the hands of producers or wholesale distributors, although priorities were given to wartime housing some months ago, turning most of the available supply into that channel. Figures are not available as to the extent of supply under control of wartime housing at this time.

Sun-Ray Treatment Is Written Off By British Government

London

• • • **Tests carried out** by the British government recently on the effects of various types of "sun-ray" treatment for workers indicate no beneficial results. The results have been reported in a research report by Dr. Dora Colebrook covering tests held in a government office, a factory, and in a coal mine over a two year period. In each case over 1000 volunteers were kept under observation.

Summarizing the results of the tests, the Industrial Health Research Board of the British Medical Research Council remarked: "It may be said that using an accepted technique of irradiation, and analyzing certain measurable features which have been claimed to be favorably influenced by it (such as sickness absences and the duration of colds), there was in these trials no evidence whatever that these benefits were in fact produced."

Group 1 received the full range of ultra-violet rays from quartz mercury-arc lamps; groups 2 and 3 received irradiation from lamps identical to those used on group 1, but fitted with glass screens impermeable to the shorter ultra-violet rays; group 4 received no treatment. All groups took capsules, some of which contained vitamins.

The conclusions formed from the report show that in none of the trials did the unscreened lamp group fare better than either of the screened lamp groups; nor did the treated groups fare better than the untreated groups.

Information Free

(1) Plant Ventilation:

A ventilating system, Air Control, that can be installed on a ridged or flat roof and incorporates 5 ft units, is described in Bulletin 46-I. High exhaust efficiencies and a continuous damper arrangement that makes operation easy and uniform are features of the system. *Protected Steel Products Co.*

(2) Refractory Concrete:

"Lumnite for Refractory Concrete," a 24 page booklet, contains basic information about various types of refractory concrete. Mixing, placing, curing and drying of both refractory insulating concretes and heat resisting concretes are discussed. Illustrations show a wide range of applications. *Atlas Lumnite Cement Co.*

(3) Prefabrication:

Folder describes theory, erection, and applications in the industrial field of Lindsay Structure. Both steel and aluminum skin stressed structures are illustrated. Also available is a short technical manual. *Lindsay Corp.*

(4) Coated Steel:

Plasteel, a roofing and siding material, is described in a 26-page catalog. It is high quality black sheet steel, coated with a plastic compound and having a final finish of pure flake mica which provides high resistance to temperature variations. Results of weather tests, are shown. Uses, installation features and engineering data are included. *Plasteel Corp.*

(5) Heat Treating Furnaces:

Belt conveyor furnaces and ovens for continuous, automatic, uniform heat treating processes, such as annealing, brazing, and sintering, are illustrated and described in pamphlet. Gas-fired, oil-fired, and electrically heated furnaces are included. Line drawings show carry-through, inside and outside discharge conveyors, and horizontal end heating types. *W. S. Rockwell Co.*

(6) Air Cylinders:

Obtaining hydraulic-type precision control for movements powered by compressed air, through the use of Air-Draulic cylinders is explained in catalog 471. Operating principle is described and ways of utilizing its advantages in machine tool, manufacturing and processing applications. Engineering specifications are included. *Logansport Machine Co., Inc.*

(7) Counterboring and Facing:

Catalog describes construction of spline-taper drive heavy duty counterboring tools and inverted spotfacers. Detailed sketches are given and tables show sizes and prices. *National Twist Drill & Tool Co.*

(8) Form Turning Head:

Swiss type form turning head for use on any lathe is described in folder. Cold finished stock may be turned without previous grinding. Length of work is limited only by the bed length of the lathe. *Oxford Engineering, Inc.*

(9) Crush Forming:

A description of the Thompson Truform grinder, with correct speeds and feeds for each contour, and how it operates to give continuous performance without disturbing setup, is given in booklet. Question and answer section on crush form grinding precision contours is also included. *Thompson Grinder Co., Inc.*

(10) Hydraulic Presses:

Air operated hydraulic presses having ram pressure controlled up to 5000 lb, and adjustable stroke of 1/16 to 5 in. are described in folder. Presses may be adapted to stamping, riveting, assembly, forming, punching and cutting operations. Specifications and prices are given. *Air-Hydraulics, Inc.*

(11) Copper Alloy Welding:

"Welding and Brazing of Copper Alloys" is a 32-page handbook describing procedures and materials for this work. Presented in three sections, the first discusses properties and characteristics of copper and copper alloys, the second gives welding and brazing procedures, and the third lists welding and brazing materials. *C. E. Phillips & Co.*

(12) Milling, Boring Machines:

Catalog No. E-53 describes construction and operating features of vertical and horizontal machines, plain and universal, production and rotary head milling machines, and jig boring machines with accessories and allied products. Specifications, including English and metric descriptions are presented in fine-line drawings and tables. All types of machines are illustrated. *Kearney & Trecker Corp.*

(13) Automatic Load Truck:

Automatic push-pull transtractor, featuring front wheel drive, push-button operated forward and reverse drive controls, is described in folder. Towing type unit is adaptable for pushing operations, and is rated at push and pull capacity of 6000 lb all day or 20,000 lb intermittently. Tow coupler can be furnished to suit each requirement. *Automatic Transportation Co.*

(14) Spot Welders:

Bulletin 112-D describes air-operated rocker arm spot welders designed with roller bearings at fulcrum point, featuring electronic controls and automatic operation. Electrode pressure is adjusted by regulator and gage, and current flow is controlled by timer. Specifications under various kva and throat depth conditions are included. *Sciaky Bros.*

(15) Safety Clothing:

Illustrated catalog shows company's complete line of work gloves. One section is devoted to safety clothing, including leggings, suits, spats and sleeve and arm protectors. Also described is a new type work glove made from a specially knitted material treated for water repellancy. *Advance Glove Mfg. Co.*

(16) Infra Red Equipment:

Extensive data on the infra red process utilized for multiple baking, drying, dehydrating and preheating operations; and infra red equipment including portable models, are featured in booklets. Outstanding features, applications and installations are included. *Fostoria Pressed Steel Corp.*

(17) Seamless Tubing:

Definitions, classifications by use, chemical analyses and tolerances of seamless mechanical tubing are covered in handbook No. M-1. Machining and testing procedures are also discussed. Similar data and tables for aircraft tubing are given in handbook A-2. Details of machining, heat treating and Magnaflux testing are included. A booklet on master weight tables includes tables for square, rectangular, hexagonal and octagonal tubing. *Ohio Seamless Tube Co.*

(18) Industrial Lubricants:

Leadolene, a lubricant with high film strength and adhesiveness, developed to fill requirements of high-heat processing conditions is described in bulletin. Other oils and greases for industrial uses are also described. *Brooks Oil Co.*

(19) Nonferrous Castings:

Chemical compositions and mechanical properties of magnesium, aluminum and copper base alloys used for castings are listed in illustrated catalog No. 45. Gives characteristics, typical uses, and specification tables. *Wellman Bronze & Aluminum Co.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

6/13/46

THE IRON AGE, New York 17, N. Y.

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INFORMATION FREE (Continued)

(20) Meehanite Castings:

Application case histories of Meehanite castings including thread gages, upsetting dies and precision machinery, described in folder Form DM 145 represent typical engineering problems solved by Meehanite foundries. A series of special bulletins is also available, covering Meehanite for pump castings, pressure castings, post-war castings, a study of friction, galling and seizing, etc. *Meehanite Metal Corp.*

(21) Electrode Guide:

Wallchart, the Selectrode chart, tells which electrode to use, suggesting currents, positions, physical characteristics, etc. Included are electrodes recommended for mild, low alloy and stainless steels, nonferrous and cast iron, surfacing electrodes, gas welding rods. *Hollup Corp.*

(22) Collets:

Details and illustrations show, in catalog No. 45, how the Martin master collet and pusher work. A flexible squirrel cage pusher, with uniform grip and suitable for round or hexagon stock is also described. Specifications and prices are listed for automatic collets, pushers and pads, and lathe and milling machine collets. *Balas Collet Mfg. Co.*

(23) Taper Checking Fixture:

Two sizes of taper inspection plates are described in Bulletin No. 50161. Included are illustrations of typical set-ups, showing device being used for checking taper of reamers, spiral reamers, tapered thread gages, lathe centers, taper gages, broach teeth and angle cutters. *Ex-Cell-O Corp.*

(24) Hard Facing Metal:

Folder outlines wear-proofing qualities of Fanweld, a hard facing metal, which is applied by oxyacetylene torch or electric arc, and lists its uses. *Fansteel Metallurgical Corp.*

(25) Portable Fire Extinguisher:

Transitank, a portable, sealed fire extinguisher, is illustrated and described in folder. CO_2 performance, covering indoor and outdoor fire hazards, is explained. Does not damage equipment or materials in process. Specifications of tank are given. *Cardox Co.*

(26) Fittings:

Condensed catalog presents a wide variety of the company's tube and pipe fittings, the new Ermeto fittings, hose fittings and assemblies, drain cocks and choke controls, valves and cylinders and T-Ring packing. *Weatherhead Co.*

(27) Coolant Systems:

Standard and centrifugal models of gear type portable pumping units with built-in automatic pressure relief valves for coolant application are described in folder along with prices and specifications. Complete operating and construction features of new Agitor model are also given. *Gray-Mills Corp.*

(28) Locomotive Engine:

Folder describes new supercharged diesel engine, Type FWL-6T rated at 660 hp at 1000 rpm and designed for locomotive service, recently added to the Cooper-Bessemer line of engines. Engine and generator are mounted together as complete power plant unit. *Cooper-Bessemer Corp.*

(29) Overhead Conveyors:

Bulletin illustrates and describes how overhead space in a number of installations has been utilized by means of chain conveyor systems. Shows applications of overhead conveyors to manufacturing operations, stockroom and warehouse procedure, and packing and shipping departments. *Lamson Corp.*

(30) Socket Wrenches:

Catalog 18 gives a complete listing of company's standard socket wrenches, indexed and grouped to facilitate locating individual wrenches. Illustrations, dimensions, dimensional drawings, and prices are given on all standard wrenches. *Apex Machine & Tool Co.*

(31) Die Castings:

Typical copper alloy die castings produced in the McGill plant are illustrated in folder and cover a variety of applications where corrosive resistance, high tensile strength and special toughness are required. Chemical composition and physical properties of several metals are included. *McGill Mfg. Co., Inc.*

(32) High Tensile Steel:

Booklet describes Otiscoloy, a high tensile, low alloy steel, which is readily weldable, easily fabricated, and corrosion resistant. Technical information, suggested applications, and design data are included. *Jones & Laughlin Steel Corp.*

(33) Gear Checker:

Folder describes the Red Ring universal gear checker and shows setups to be used for performing various operations. Also described is a gear rolling fixture which tests work gears in mesh with a master mating gear for eccentricity, tooth roughness and pitch diameter by rolling them together. *National Broach & Machine Co.*

(34) Mixing and Grinding:

Bulletin describes the applications of worm gear speed reducers to various types of mixing and grinding equipment, and contains photographic illustrations featuring installations of worm gear units on equipment used by various industries. *The Cleveland Worm & Gear Co.*

(35) Casting Radiography:

Reprint of article entitled "X-ray as a Foundry Control Tool" covers such topics as how X-rays are produced, equipment costs and small casting production inspection. Radiographs show most common defects encountered in magnesium castings. *North American Philips Co., Inc.*

(36) Clamshell Buckets:

Four type clamshell buckets are described in a new illustrated booklet. The buckets are designed for handling coal, iron ore, openhearth slag, Lake boat cargoes and most granular, free-flowing materials. Line drawings show various buckets and how they are geared and reeved. Performance data are included. *Blaw Knox Div., Blaw Knox Co.*

(37) Aircraft Valves:

Series of booklets describe Parker line of forged aluminum alloy angle and offset aircraft valves, Oxyseal, an oxygen line pipe thread sealing compound, which is said to be non-inflammable, and tube couplings, special valves, together with various accessories such as tube cutters, benders and valve lubricants. *Parker Appliance Co.*

(38) Hydraulic Presses:

Bulletin 119 describes packaged, standardized multi-unit hydraulic presses which include the pumping unit, power head, standard frame and bolster. Also described are various controls and accessories to increase the range of applications of multi-units. Self-contained units made possible many adaptations in installation to suit specific needs. *Denison Engineering Co.*

(39) Hypersonic Analyzer:

The Hypersonic analyzer described in this booklet can detect any change in density of a wide variety of materials. How the analyzer works and various uses are shown. Second booklet gives specifications on Brush line of direct inking magnetic oscillographs for making instantaneous, permanent, ink-on-paper recordings of wide frequency range. *Brush Development Co.*

(40) Injection Molding:

Outstanding feature of the Lester injection molding machine described in this bulletin is the internally heated vertical injection cylinder into which the granular thermoplastic material is metered, plasticized and then injected, under pressure, into the mold cavities. Full details of the injection cylinder, as well as specifications of the molding machines, are given. *Lester-Phoenix, Inc.*

(41) Metal Cleaning Machine:

Illustrated new bulletin describes new machines for metal parts cleaning and gives methods of handling parts cleaning operations efficiently. *Optimus Equipment Co.*

(42) Induction Heating Units:

32-page illustrated book describes many industrial applications of induction heating; includes many problems of grain growth, surface decarburization, distortion and warpage, as well as information on numerous phases of heat treating, metal joining and melting. *Lepel High Frequency Laboratories, Inc.*

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Diameter of Bolt	Actual breaking load	Weight per 100 bolts	Ultimate tensile strength	Material	Heat treatment	No. of threads per in.	Root diameter	Area at root diameter	Length under head
A—3/4"	26,300 lbs.	85 lbs.	75,000 psi	SAE 1020	None	16	0.669 in.	0.351 sq. in.	6 in.
B—3/4"	43,900 lbs.	85 lbs.	125,000 psi	SAE 1035	Quench, draw	16	0.669 in.	0.351 sq. in.	6 in.
C—3/4"	52,600 lbs.	85 lbs.	150,000 psi	SAE 3135 or NE Equivalent	Quench, draw	16	0.669 in.	0.351 sq. in.	6 in.
D—5/8"	30,000 lbs.	58 1/2 lbs.	125,000 psi	SAE 1035	Quench, draw	18	0.553 in.	0.240 sq. in.	6 in.
E—5/8"	36,000 lbs.	58 1/2 lbs.	150,000 psi	SAE 3135 or NE Equivalent	Quench, draw	18	0.553 in.	0.240 sq. in.	6 in.
F—1/2"	18,600 lbs.	37 lbs.	125,000 psi	SAE 1035	Quench, draw	20	0.435 in.	0.149 sq. in.	6 in.
G—1/2"	22,300 lbs.	37 lbs.	150,000 psi	SAE 3135 or NE Equivalent	Quench, draw	20	0.435 in.	0.149 sq. in.	6 in.

IT MAY BE POSSIBLE TO USE A BOLT

—half the weight you've specified!

Can such a cost reduction be made *safely?* Here's *proof* that it can be done.

Look at the table of relative values for three of the bolts shown —each of them ¼ in. diameter by 6 in. length, and then compare them with the two smaller bolts, one ⅜ in. x 6 in. and the other ½ in. x 6 in. In the variation of their physicals lies your opportunity to profit by Lamson engineers' "know-how".

The table shows that you can use a bolt approximately *half the weight and size* of another, and for many applications, obtain all of the essential values you need in your assembly. Or you can continue using the same size bolt, but with higher physicals than you've previously specified—*and use fewer of them.* Bolts in larger and smaller sizes than those shown, made of similar materials, made the same way, properly heat treated, will develop proportionately the same characteristics and physicals as these five bolts shown.

What about the savings you can make by using smaller bolts or by using fewer bolts? First of course is the lower cost per 1000 bolts in a smaller size than you are using. Smaller bolts or fewer bolts *cost less to ship,* require *less storage space,* and need *smaller holes or fewer holes* drilled for their assembly.

Investigate—ask a Lamson engineer to look over your design while it is still on the drawing boards, or let him look over the completed assembly and make his recommendations to you. It's a Lamson engineer's job to "know how".

THE LAMSON & SESSIONS COMPANY, 1971 W. 85th St., Cleveland 2, Ohio

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

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☐ Simplified Stock Sizes

Send information on ☐ Machine Screws ☐ Lamson Lock Nuts
☐ Lock-washer Screws ☐ Thrd. Forming Screws

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Ask your Jobber for the Lamson Line

STUDS · STOVE BOLTS · SHEET METAL SCREWS · WIRE ROPE CLIPS · PIPE PLUGS · WEATHER-TIGHT BOLTS · MACHINE SCREWS AND NUTS · SPECIALS

WELDING with an eye M
OF HEAVY PRES W

Up-to-date facilities and men trained to meet exacting standards of precision, make the fabricating and machining of large structure weldments standard production at Danly.

The mechanical press crown *left* brought no problem of size to Danly engineers and setup men. Sub-assembly construction permitted several crews to work on the components at the same time. This method cut much costly handling time—avoided inaccuracies in dimension and distortion which frequently occurs in welding of large structures.

Floor type boring mills *like the one shown at right* simplify exacting machine work. The horizontal indexing table makes it possible to machine each side of the press bed with but a few minutes to index the table and resume work on the next surface. The right-angle boring head *inset* makes possible complete internal milling and boring at any angle through 360 degrees.

DANLYWELD

Welded and Machined at Lower Final Cost

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2100 SOUTH 52nd AVEN

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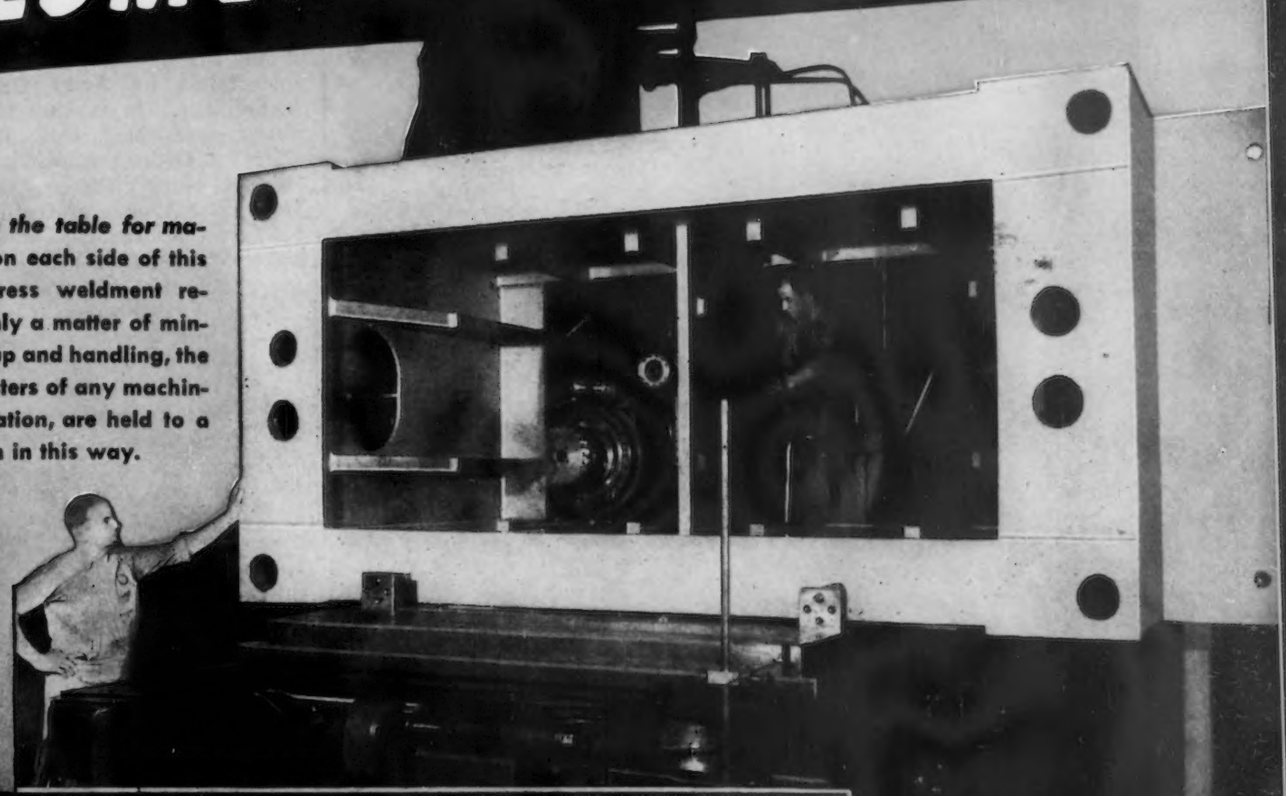
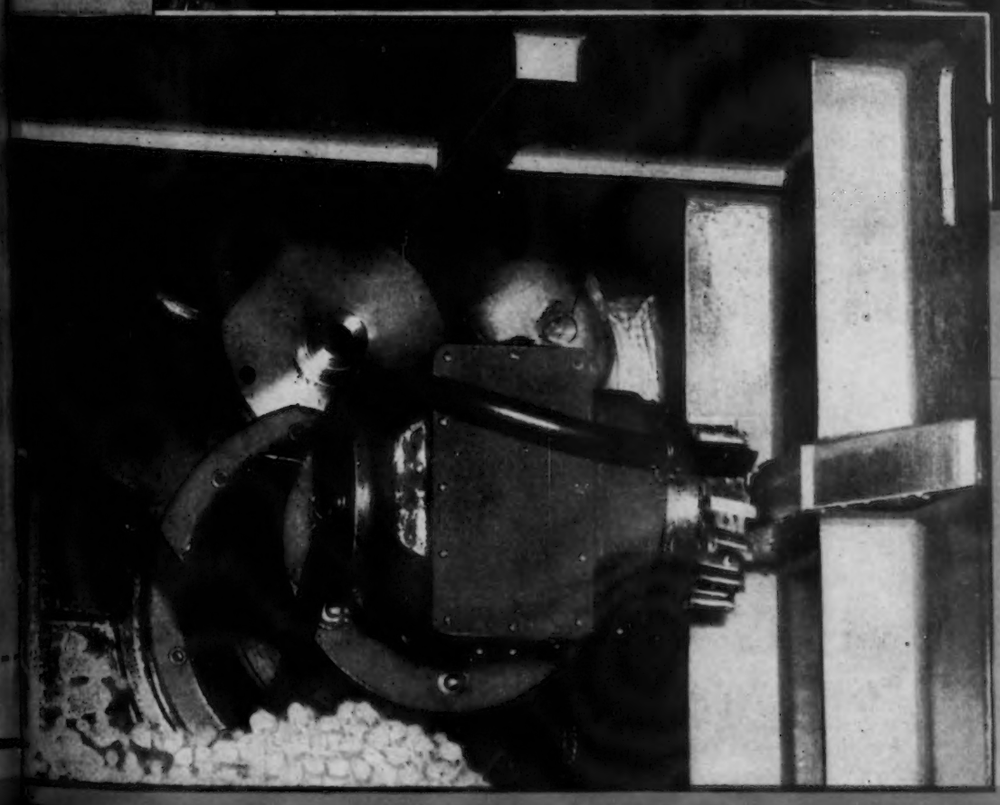
ESWELDMENTS BY DANLY



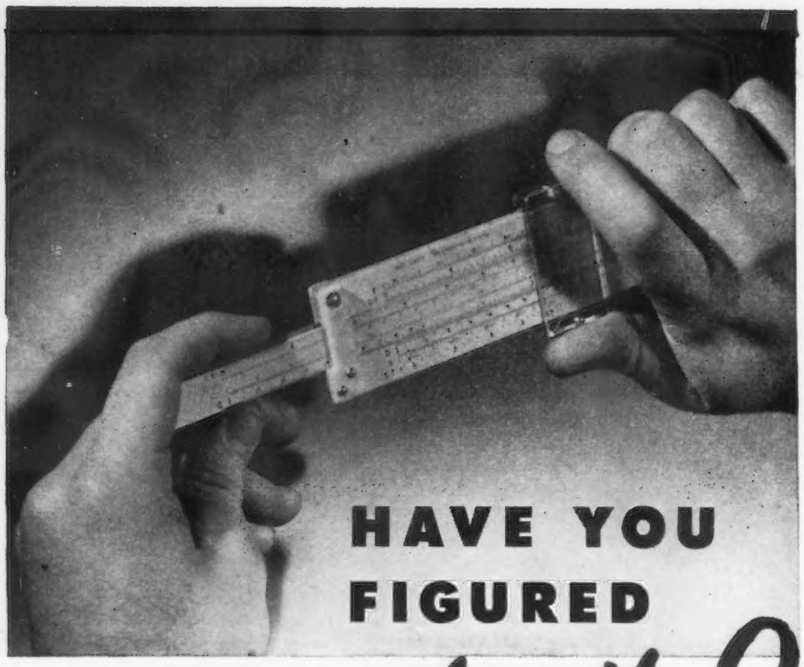
Indexing the table for machining **on each side of this heavy press weldment requires only a matter of minutes. Setup and handling, the time wasters of any machining operation, are held to a minimum in this way.**



This right-angle boring head **runs into deep wells and interiors for machining on surfaces like the side cushion guides on the press bed** ***shown here.*** **Complete internal milling at any angle is possible in one setup.**

N SPECIALTIES, INC.

CHICAGO 50, ILLINOIS



Material handling?

PRODUCTION SKILLFULLY PLANNED, plant in tip-top shape, sources of supply secured —how about material handling—the vital factor in profit? Still using manual methods of yesteryear? *Use Clark Fork Trucks*—to lift, move and stack material. It's the time-saving, money-saving modern method, paced to the needs of current production.

Have a Tructractor Field Engineer study your needs—and engineer a plan to meet them.

CLARK

GAS and BATTERY POWERED FORK TRUCKS, PLATFORM TRUCKS, TOWING TRACTORS

CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN
OTHER PLANTS — BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

Undertakes Developing Flexible Body Armor To Help Infantrymen

Washington

• • • **Perfection of a** flexible body armor for foot soldiers has been undertaken by Army Ordnance technicians. In making this announcement, Maj. Gen. Everett, Chief of Ordnance, said that an effort is being made to give these soldiers that same protection that halved the number of deaths among "flak suit" clad Air Corps personnel in World War II. Development of these suits, consisting of aprons, vests, neck, eye, groin and crotch protectors, is looked upon by the technicians as their crowning achievement.

Pointing out that the problem is to provide this protection to reduce the shock of bursting shells without further impeding mobility, reference was made to the success in armor-equipping snipers and other infantrymen whose duties do not call for a high degree of mobility; tank crews, photographers, bulldozer drivers and engineer personnel engaged in mine-clearing operations as well as flyers.

The story of ordnance research into the craft of the ancient armorer was secreted in the classified files of the War Dept. until shortly before the end of World War II.

The renaissance of body armor, it was pointed out, began during World War I with the advent of modern artillery which poured a merciless barrage of high explosive and shrapnel on unprotected troops in their shallow trenches. Armor, outmoded since the growth of firepower in the Thirty Years War in the 17th Century, was again adopted by the French in the form of steel headgear in World War II. Helmets were the only protective armor widely used by all combatants in World War I, but U. S. Army Ordnance Dept. research into more complete body coverage begun then, and continued through the peace years, saved hundreds of American soldiers' lives in World War II.

With the idea of designing protective garments which would allow airmen freedom of movement to perform their combat duties, the Ordnance Dept. prepared

(CONTINUED ON PAGE 132)

CUT CARBURIZING CYCLE IN HALF!

ALL TYPES OF GEARS
A mechanized Ajax furnace for carburizing gears. Distortion is held to less than .0008". Over-all costs are lower than by previous method, and the heating cycle cut 50%. Corresponding results can be obtained in carburizing other automotive parts.
PRECISION MACHINED PARTS
A standard Ajax furnace, adapted to monorail handling, for carburizing precision machined parts—and where distortion is held to less than .001" and rejects held to less than .5% of production. Here again the cycle is greatly reduced.
FORMED SHAPES
In this furnace aircraft armor was selectively carburized —with minimum distortion—to a case depth of .060" in less than 8 hours. In this instance, the time cycle was cut 65% over previous method used.

Yes, and in hundreds of other installations throughout the metal-working industry carburizing cycles are being cut in half—and more than half! Ajax furnaces provide the fastest means of heating work for carburizing. Therefore, they will yield more completed heating cycles per day than any competing method. The unique Ajax immersed-electrode principle, combined with absolute, automatic temperature control, holds temperatures to within 5° F. Uniform heating conditions assure minimum distortion and ideal carburizing conditions. Of course, there is no oxidation or scaling. For case depths of .125" and more, Ajax furnaces are proved beyond question. They are ideal for selective carburizing, too!

Many more are in use for cyanide hardening —where a light, file-hard case is desired in low carbon steel parts, or for hardening finished machined straight carbon steel or alloy steel parts. For further information on the above, or any heat-treating problem, write —

AJAX ELECTRIC COMPANY, INC.
Frankford Ave. at Delaware Ave., Philadelphia 23, Pa.

THE WORLD'S LARGEST MANUFACTURER OF ELECTRIC HEAT TREATING FURNACES EXCLUSIVELY!

***In Canada:* Canadian General Electric Co., Ltd., Toronto, Ont**

THE AJAX HULTGREN ELECTRIC SALT BATH FURNACE

Associate Companies: **Ajax Metal Co. • Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.**

PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MAC PHERSON

GREAT STREAM OF PETROLEUM WOULD BE ONLY A TRICKLE —WITHOUT STEEL

Without steel, the great stream of petroleum that now flows full and strong to benefit mankind with its manifold products, might have remained the mere "rock oil" trickle it was in the pioneer days in Pennsylvania. Then, shallow wells were slowly "kicked down" by foot power, or drilled from little wooden derricks by small, steam-driven rigs with iron boilers, iron engines, handmade iron tools and other rudimentary equipment. Production was exciting, but very scanty compared with today.

Today, steel does the drilling. Across the continent and around the world, steel brings in the oil. From towering steel derricks with steel tools, drill pipe, casing, tubing, wire rope and rotary rigs, wells can be drilled three miles into the earth in less time than the pioneer rigs could make a hundred feet or so of hole.

Steel research, working with petroleum research, developed some marvelously tough, hard, strong steels for the big jobs in the oil fields. But when the wells of tomorrow go still deeper to swell the beneficent flow of the petroleum stream, there will be at hand still tougher, harder, stronger steels designed for the greater depths, the harder service. Such steels are being developed and produced by Jones & Laughlin Steel Corporation in the continuous improvement of its line of oil country goods.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

LIGHTER, STRONGER, CONTROLLED QUALITY STEELS

OIL & GAS WELLS

Rotary drilling rigs in today's oil and gas fields use special steel tools that grind and cut rapidly through hard rock at the end of a long string of steel drill pipe rotated by a drill table. Jones & Laughlin developed and patented Integral-Joint Drill Pipe with joint forged as part of pipe to add strength and eliminate two-thirds of threaded connections.

Early names for petroleum were Seneca oil, Genessee oil, fossil oil, rock oil.

For "kicking down" a well in pioneer days, a pole was placed over a log, the butt end pegged outside the derrick and drilling tools suspended near whip end inside derrick. Attached to tip of pole were stirrups in which two men placed a foot and "kicked" down. By repeating this procedure all day they could drill about 3 feet of hole.

Walls of Babylon, its palaces and temples were cemented with asphalt from the Fountain of Is, oil springs in Euphrates Valley.

Drake well museum and memorial park, maintained in Titusville, Pa., by the Commonwealth of Pennsylvania, is a rich repository of photographs, documents, papers, equipment and other memorabilia preserved from the days of the "oil excitement," touched off in 1859 by Col. E. L. Drake's discovery well which struck oil at 69½ ft.

Oil still taken out of Drake well is sold in 10-cent bottles to visitors for souvenirs.

20 ft. of iron pipe and a water pump was pumping equipment on first oil well. Today, special steel tubing in long lengths of great strength, such as J&L makes of Controlled Quality steel, withstands high pressures and "pull" of suspension in hole.

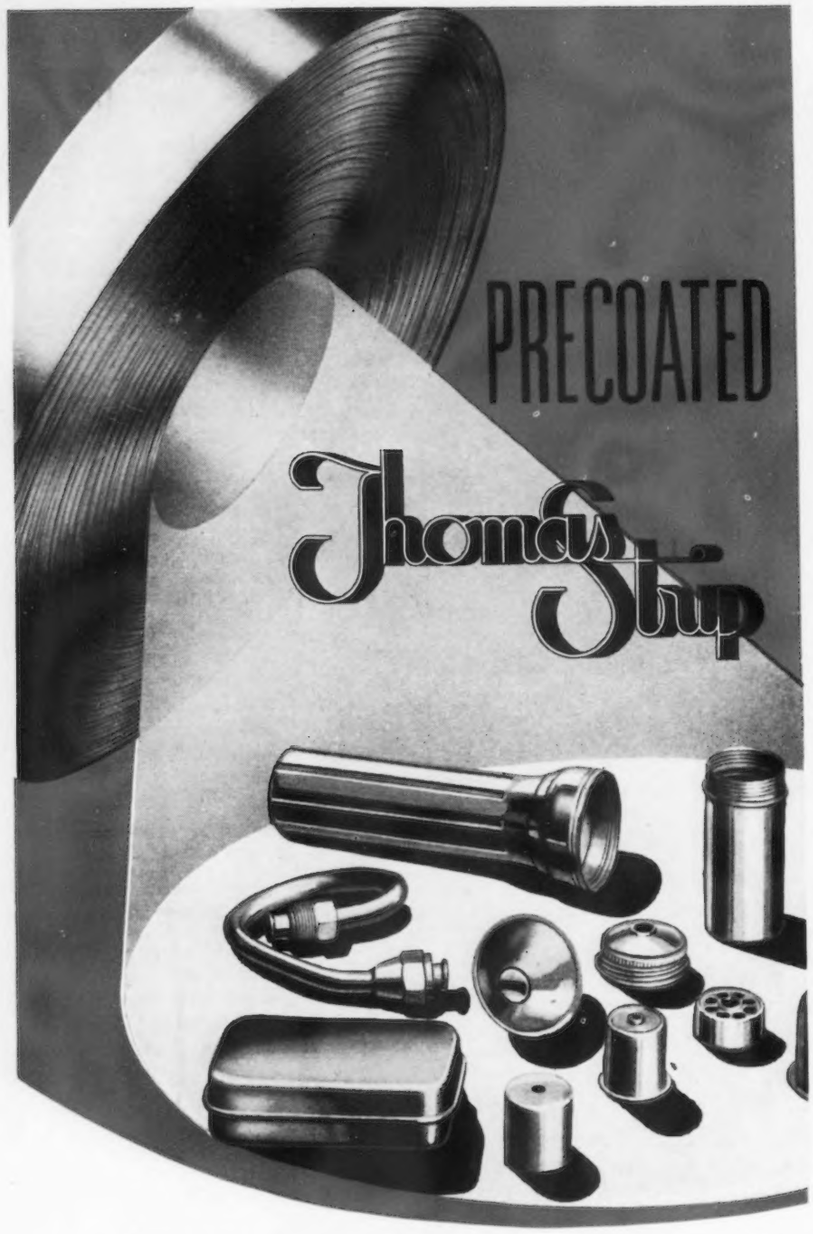
2 octogenarian wells still producing oil are McClintock No. 1, near Oil City, Pa., and Buell No. 1, near Macksburg, Ohio.

Early oil wells were started by digging pit within derrick. Then a "casing" (invented by Col. Drake) was put in to shut sand and water out of hole. It was usually iron pipe in short lengths connected by iron bands heated and shrunk onto the pipe. Today's wells are safely and speedily cased with long lengths of seamless steel pipe easily threaded or welded together. Hundreds of miles of casing are made yearly by J&L.

Sea grass rope, used on pioneer wells, was replaced by manila. But, not until development of steel wire rope, such as J&L Precisionbilt Oil Country lines, could oil and gas well drillers run heavy strings of tools without danger of losing them in the hole.

New J&L handbook of tubular products for oil industry containing many tables and other useful information may be had by writing on your business letterhead to Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

COPYRIGHT 1946, JONES & LAUGHLIN STEEL CORPORATION



ThomaStrip, electro-coated with either zinc, nickel, brass, or copper, or ThomaStrip hot dipped coated with solder or tin, offers lasting protection and improved appearance at low cost. Drawing, bending, and forming operations are performed easily without removing the coating. Thomas Cold Rolled Strip Steel in coated and uncoated finishes is also selected by many manufacturers because of its uniformity of temper, gauge, and finish. When considering material for a new product or for product improvement, write to The Thomas Steel Company for its recommendations.

ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS... HOT DIPPED TIN AND SOLDER... LACQUER COATED IN COLORS... UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES

THE THOMAS STEEL CO. • WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS

armor requirements based on its knowledge of ballistics and materials. These requirements were compiled under the direction of Col. Rene R. Studler, Chief of the Small Arms Development Div. of the Ordnance Dept., and given to the Curator of Arms and Armor at the Metropolitan Museum of Art.

The curator's staff includes skilled craftsmen who have any one of hundreds of highly specialized tools necessary to the armorer's trade readily available. They produced models in the Armorer's Workshop for all the protective garments worn by American soldiers, together with a number of specialized helmets for flyers working in cramped quarters. The first models had thin, overlapping sheets of special steel in a quilted garment. Improvements made during the war featured aluminum plates padded in nylon, which weighed 20 pct less than old body armor. The various combinations of airmen's armor were attached one to another by quick release fasteners so that they could be quickly jettisoned before abandoning ship.

A comparative tabulation of casualties among air force personnel has revealed that only 18 pct of the men who wore armor were killed and 13 pct wounded enough to require medical treatment. Thirty-six pct of the Air Corps personnel who did not wear armor were killed and 64 pct were wounded as a result of enemy fire.

Electrical Items Freed

Washington

• • • **Suspension of price** control on additional electrical machinery and equipment items which were not included in the Apr. 8 order has been announced by OPA. This action became effective May 24 and extends decontrol action over electrical transmission equipment with the exception of wire and cable. Items covered are as follows:

Coils specifically designed and made for motors, generators and related equipment; distribution cut-outs (not including building equipment and supply items); pole line hardware and line construction specialties; and power switching equipment except that of 601 volts or lower.

Hydratrol Lathes

HEAVY DUTY TYPE

"THE BEST LATHE EVER MADE!"

SAYS AUSTRALIAN MFR. OF PRECISION PLASTICS

THE above photo, taken in the plant of E. W. Tilley, Melbourne, shows a 24" Heavy Duty HYDRATROL LATHE. The operator is turning dies for use in the production of Precision Plastics. A steel billet is shown, ready to go into the lathe.

In a recent letter, this concern said: "We have had lathes from all nations in use these twenty-five years, but your lathe is certainly something to be proud about.

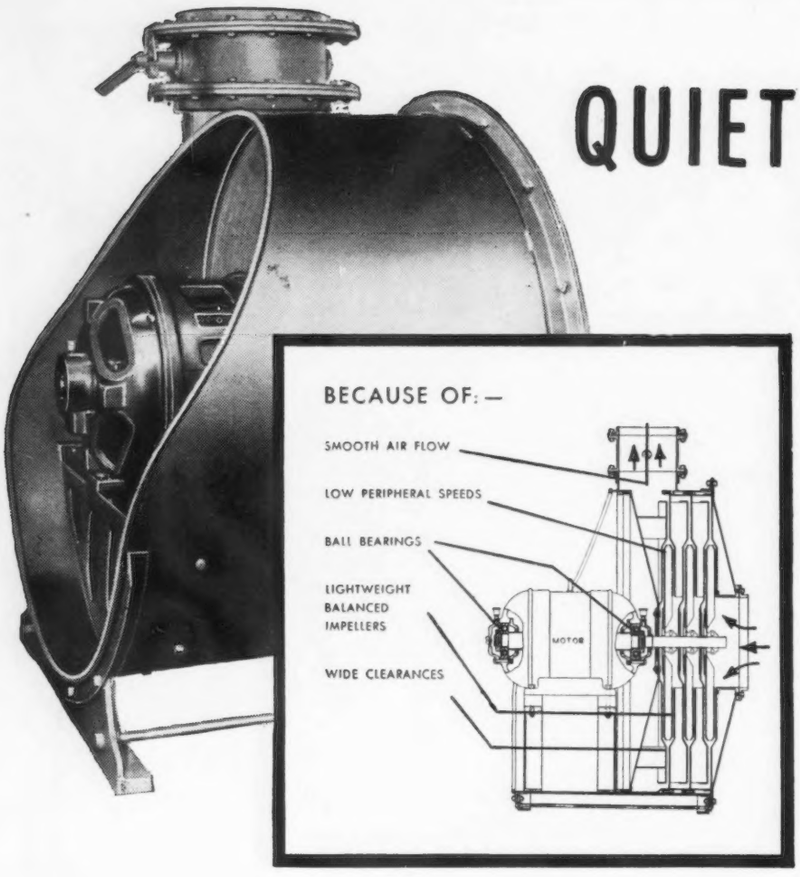
"We have found that the design is really marvelous, and has been carried out to perfection.

"I, and all my business friends that have seen this Hydratrol Lathe working, agree that it is the best engine lathe ever manufactured."

Let us show you what a Heavy Duty HYDRATROL LATHE could do in your shop. Sizes 20" to 36". Also Large Hollow Spindle Type—sizes 18" to 36".

Lehmann MACHINE COMPANY

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI



Spencer Turbos deliver large volumes of air with constant pressure regardless of load.

Besides the points indicated above, Spencers are simple as an electric fan, have only two bearings, and a one-piece, all-metal casing, reinforced by ribbed end sections. A bridge-like casting supports the motor and rotating elements and evenly distributes the weight.

There's a QUIET Spencer Turbo of the exact volume and pressure you need. You can mount it anywhere without special foundations. The discharge can be arranged for any one of four positions. It will serve you well for a lifetime.

SPENCER
HARTFORD

The Spencer Turbine Company
Hartford 6, Connecticut

257-D

TURBO-COMPRESSORS

Army-Navy Munitions Board Surveys Sites For Underground Use

Washington

• • • **While disclaiming any** present intention of recommending the placement of any industries underground, a recent joint Army-Navy release announced that the Army and Navy Munitions Board has undertaken a survey of underground sites throughout the nation which might be utilized for long-term storage of machine tools and war production equipment adaptable in wartime for vital industrial production and other military purposes.

It was declared that the primary purpose of this survey is to locate underground sites suitable for the safe and economical storage of equipment owned by the government which would otherwise require extensive surface storage facilities. It was pointed out that in the course of the study, in addition to the storage feature, the survey may develop certain sites which, in the event of an emergency, would be particularly adaptable for housing vital industries should this become necessary.

The survey is only one phase of the extensive program being carried on by the Board which consists of the Board's Executive Chairman, Richard R. Deupree, president of Procter & Gamble; Under Secretary of War Kenneth C. Royall; and Assistant Secretary of the Navy W. John Kenney. The executive chairman is the chief executive of the Board. Its operating personnel are chosen from specially qualified officers and civilians from the War and Navy Depts.

Army engineers, working under the direction of a special committee of the Board, will do the actual cataloguing of the underground areas and will grade them according to their various characteristics. Both natural caves and man-made caverns such as mines are to be studied.

Among the characteristics to be recorded are floor space, ceiling, humidity, overhead cover, soil and rock conditions, access approaches and general interior conditions. Other factors which will be considered are concealment from aerial observation, and proximity to transportation, communications, utilities, and housing facilities.

The Board's committee on under-

It's a family matter!

You can bring the widest variety of problems about fluids-moving to Fairbanks-Morse—*and keep them in the family!* Here's a single source—world-known and pump-wise—of proved pumping equipment, including the largest to the smallest centrifugals, vertical turbines and a broad line of special application types.

WHY NOT **place your pumping difficulties in the hands of recognized experts—men who have the broadest line, unlimited manufacturing facilities and a 116-year-old background of scientific research to offer you? See your Fairbanks-Morse dealer or call our local branch office now.**

SILENT MEMBER— **An added advantage is the line of electric motors designed and built by Fairbanks-Morse—for use on Fairbanks-Morse pumps. *They cut your pump selection job in half*—give you a pump manufacturer ready to take *all* the responsibility in selecting your pump and the power to operate it!**

OUT OF THE HOLE—Fairbanks-Morse and Pomona deep-well turbine pumps have long been at home in bringing water out of the hole at rock-bottom cost—on farms, factories and wherever vertical turbines are used.

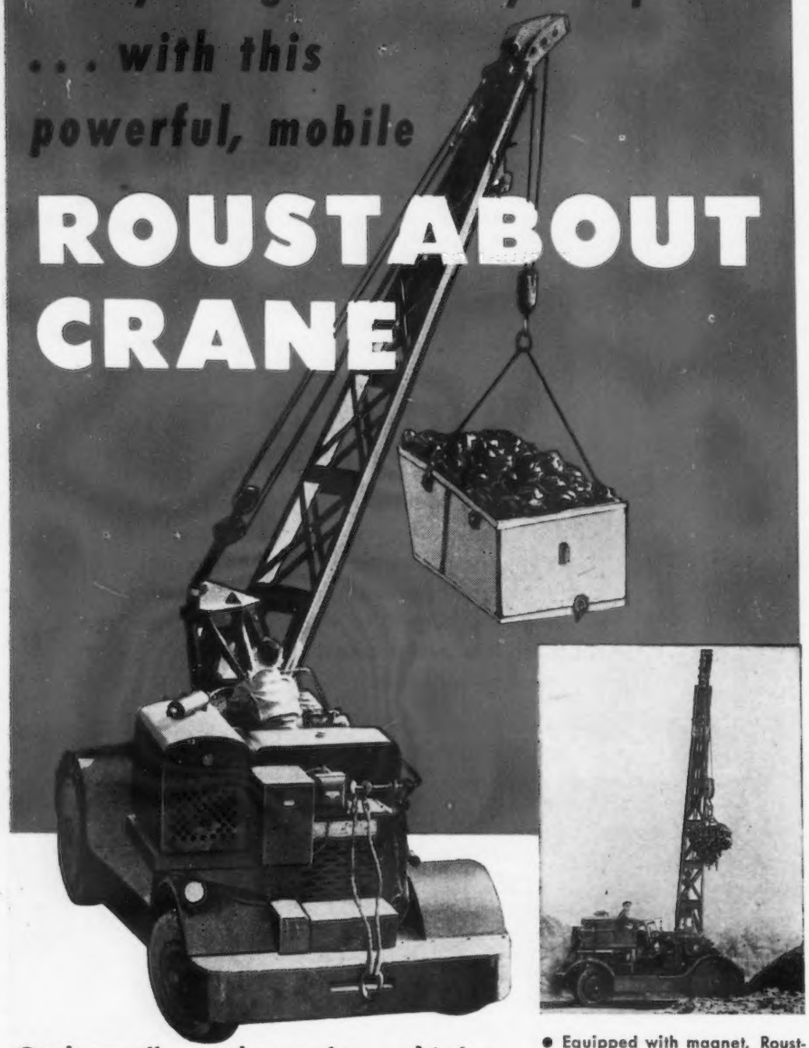
FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES · DIESEL ENGINES · MAGNETOS · GENERATORS · MOTORS · PUMPS
SCALES · STOKERS · RAILROAD MOTOR CARS and STANDPIPES · FARM EQUIPMENT

Faster, lower-cost movement of everything around your place . . . with this powerful, mobile

ROUSTABOUT CRANE



• Equipped with magnet, Roustabout handles scrap, ingots, etc.

• With grab-bucket, Roustabout hustles sand, cinders, etc.

Outdoors, all around your plant, and indoors when needed, the Roustabout does 101 jobs quickly inexpensively — saving costly delays, getting things done without taking crews from other work. It loads, unloads, shifts, stacks anything to 7½ tons. It's *where* you want it *when* you want it. Hundreds of users swear by its usefulness, its durability. Modernly engineered for years of overwork, ball-bearing boom turntable, all gears in oil. To bring yard efficiency up to plant level adds to your profits — and that's what Roustabout does. Write today for the whole story . . . it's worth money to you.

THE HUGHES-KEENAN COMPANY
571 NEWMAN STREET • MANSFIELD, OHIO

ROUSTABOUT CRANE

Roustabout Cranes
By Hughes-Keenan
Load-Handling Specialists Since 1904

ground sites functions as a coordinating agency between the War and Navy Depts. and other government and private agencies with regard to planning for the use of underground areas. At the conclusion of the survey, the committee will make recommendations to the Board on the extent to which the use of underground areas is desirable, and on the practicability of placing industrial machinery and materials in such locations. In addition, the committee will estimate construction and alteration costs for any program recommended.

Meanwhile, other special committees of the Board are proceeding with programs designed eventually to simplify and standardize the problems of industrial mobilization.

Among the more important is the Strategic Materials Committee, comprised of representatives of the War and Navy Depts. and the Depts. of State, Treasury, Interior, Agriculture, and Commerce, and the CPA. This committee makes recommendations as to what materials are to be classified as strategic and critical, and how funds made available by the Congress for the purchase of stockpile materials are to be utilized. It recommends the kinds, quantities, and specifications of such critical materials.

Another activity is the Joint Army and Navy Specifications Board, its objective being the coordination and development of joint service specifications on items, materials, processes, and standards issued by the War and Navy Depts. Wherever possible, this Board will establish joint Army-Navy standards for capacity, dimensions, and tests.

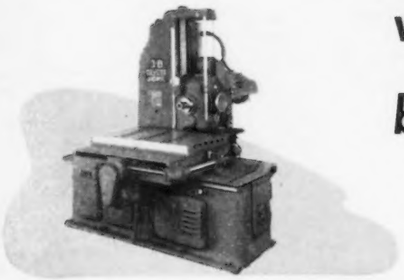
The Joint Procurement Assignment Committee investigates for the Board existing or potential duplications of procurement between the two services. Where appropriate, it recommends to the Board the assignment of the responsibility for purchase of specific items or classes of items to either the War Dept. or to the Navy Dept. It also recommends appropriate standardization of items or classes of items between the Army and Navy.

The Board has also set up an Industrial Facilities Committee which is to advise on all matters related to the establishment of such facilities for the peacetime Army and Navy and nucleus for operation

Retract and Reposition Your Work

within .0002" Selected Location

by Push Button Controls!



3-B DEVLIEG JIGMIL Provides for

Minimum Tool Overhang

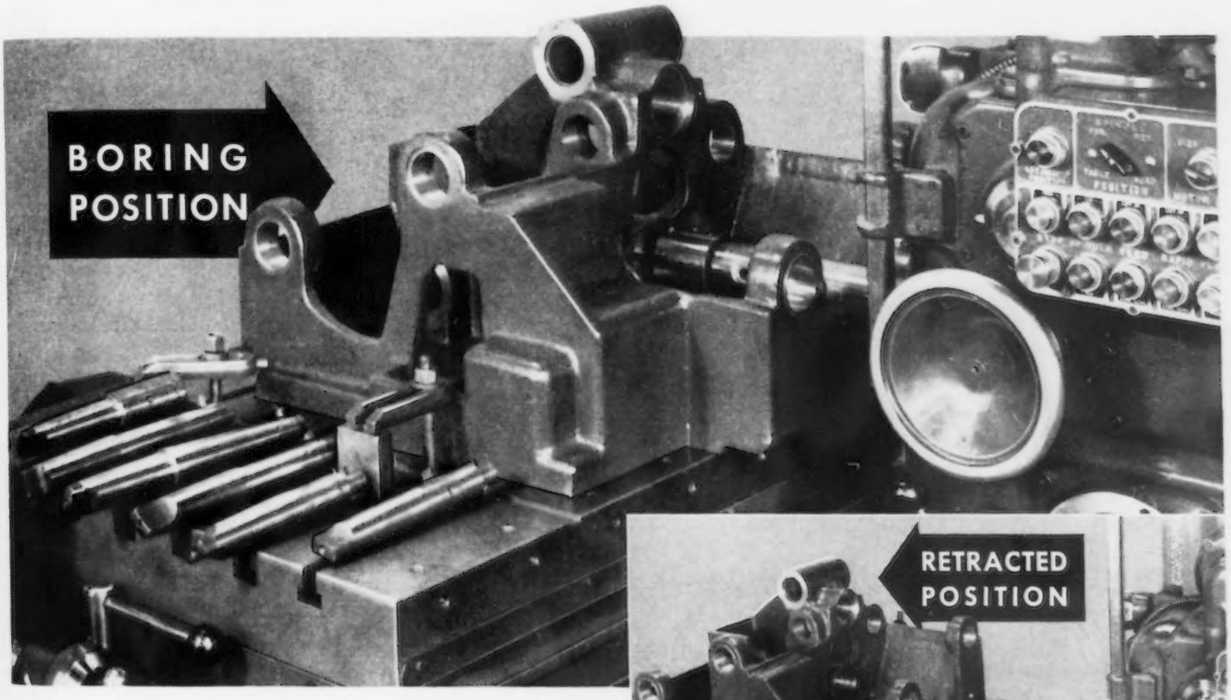
Maximum Operating Efficiency

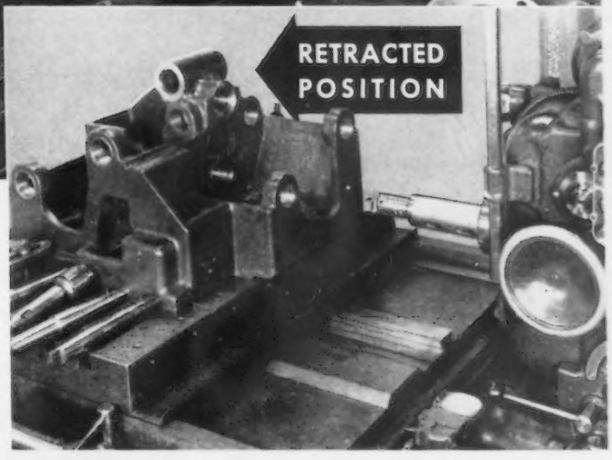
Greater *Controlled* Accuracy

You can save time, cut costs and reach new high standards of accuracy on your difficult precision jig boring and milling operations with a 3-B DeVlieg JIGMIL.

Location of work for minimum tool overhang and top performance advantage! Ready accessibility for necessary tool adjustments and changes! Convenience for checking machined dimensions! All these are served by JIGMIL's centralized push button control means which unlocks and retracts the table to open position, then automatically repositions and locks the table to within .0002" of the selected position.

In addition, JIGMIL's push button controls provide automatic hole spacing accuracy within .0001". Write today for complete descriptive and technical literature.

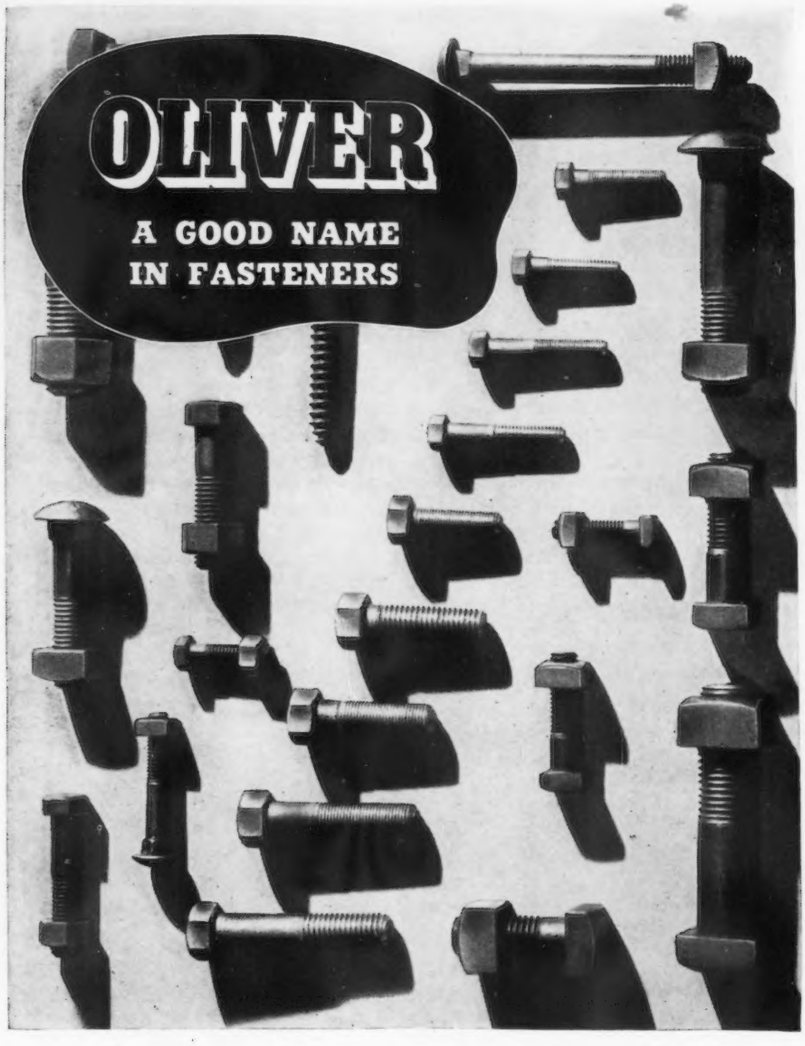




Here's Precision Boring at its Best!

The work piece above is an intricate casting for a three way diamond boring machine. All holes were bored on a 3-B DeVlieg JIGMIL to size, length and spacing accuracies of within .0001". Of the five castings comprising this particular job, the same high JIGMIL standard of accuracy was maintained throughout for perfect interchangeability of parts!

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**



OLIVER QUALITY FASTENERS

Accurately made • Uniform • Dependable

The complete line of Oliver Industrial Fasteners includes bolts, nuts, rivets, cap screws, lag screws and special fasteners of all commercial sizes. Materials, heat treatments, protective coatings and other specialized features meet your particular needs.

Specify OLIVER Fasteners for highest quality.

OLIVER IRON AND STEEL Corporation

SOUTH TENTH AND MURIEL STREETS, · PITTSBURGH 3, PA.

and expansion in case of a future emergency. The Committee will make recommendations on legislation required to place War or Navy Dept. or RFC-owned industrial facilities into the active or standby categories of the peacetime program, on the designation of industrial facilities that should be included in the program under the ownership of the War or Navy Depts., the selection of basic industries that should be included in the program, and the coordination required with civilian industry to supplement the program.

Another Committee coordinates the activities of the Army Packaging Board and the Navy Packaging Board to resolve differences between them. It insures to the greatest extent feasible the adoption of uniform instructions related to packaging and packing, insures a uniform interpretation of specifications and recommends, where necessary, the revision of such specifications.

The Ordnance Procurement Committee was established by the Board to consider joint ordnance procurement problems in light of the experiences of World War II. Its objective is to bring about maximum standardization and maximum practical economies from joint procurement or single procurement for both services.

Other committees of the Board deal with lumber, the procurement of medical and surgical equipment and supplies, requirements of basic and raw materials, components and end products, and the procurement and standardization of marine equipment and supplies.

Bolt and Nut Specs Ready

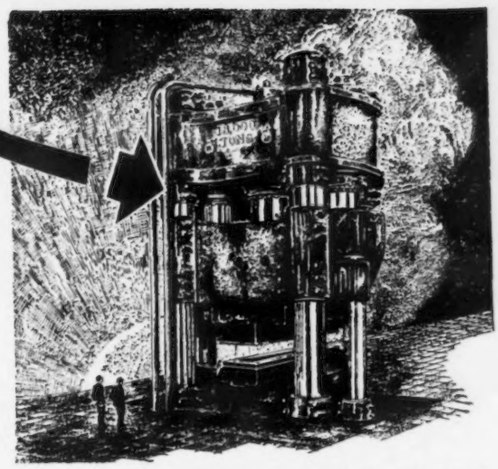
Washington

• • • **Printed copies** of Simplified Practice Recommendation R169-45, Bolts and Nuts (Stock-Production Sizes) are now available according to an announcement of the Div. of Simplified Practice of the National Bureau of Standards.

The recommendation establishes a simplified list of stock-production sizes for square-head and hexagon-head machine bolts, square-neck carriage bolts, square-head lag bolts, square-neck step bolts, elevator bolts, tire bolts, as well as regular, heavy, light and machine-screw and stove-bolt nuts, also milled studs.

18,000 TON Die Forging Press

WILL TEAM UP with R-S FURNACES



Looming on the horizon—the largest die forging press in the world, now in process of installation at Wyman-Gordon. When this press is completed at the end of this year, magnesium and high strength aluminum alloy forgings larger than any yet made will be available. This press will be operated by Wyman-Gordon Products Corporation, a wholly owned subsidiary of Wyman-Gordon Company for the account of Reconstruction Finance Corporation which owns the press, and will be available to aircraft manufacturers in particular and to industry generally for experimentation in and for the development and production of light metal forgings. This means to our aircraft industry reduced weight which, in turn, means increased pay-load and greater performance for American planes . . . And for industry in general—complete ranges of magnesium and aluminum forgings.

WYMAN - GORDON
PRODUCTS CORPORATION
WORCESTER, MASSACHUSETTS, U. S. A.

R-S
QUALITY PRODUCTS SINCE 1908

General Offices: Philadelphia 44, Pa.
New York • Detroit • Pittsburgh • Chicago • Buffalo
Cincinnati • Cleveland • Houston • Washington • Los Angeles
Buenos Aires • Rio de Janeiro • Sao Paulo • Mexico City

This, the largest die forging press in the world, will make available larger magnesium and high strength aluminum alloy forgings than any yet made.

Wyman-Gordon Products Corporation selected four R-S Furnaces for the heat-treatment of work to be turned out by this mammoth press.

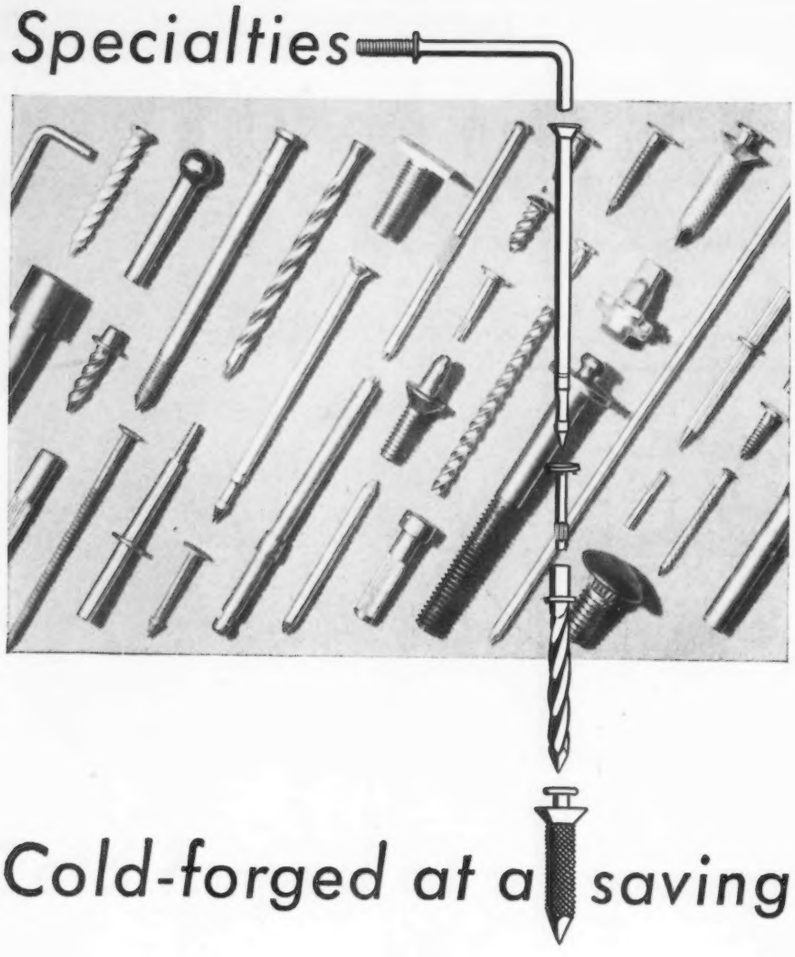
3 R-S Continuous Convection Type Forging Furnaces

1 R-S Covection Type Heat-Treating and Aging Furnace

This is another instance of selection due to R-S designing ingenuity, rugged construction and dependable performance.

FURNACE DIVISION
R-S PRODUCTS CORPORATION
Manufacturing Engineers

Specialties



Cold-forged at a saving

If you need a special rivet, nail or threaded part—and soon—we can make it for you. Cold-forging offers you not only surprisingly quick delivery, but a substantial saving as well.

Steel, Stainless Steel, Monel, Brass, Copper, Bronze, Aluminum and Aluminum Alloys are everyday materials to us. A varied stock of sizes and metals is available to serve you.

Both economy of manufacture and strength of product are obtainable by using cold-headed parts. Send us a sketch or sample of your part. No obligation. Ask for free catalog.

JOHN HASSALL, INC.

405 OAKLAND ST., BROOKLYN 22, N. Y.

SPECIAL NAILS RIVETS SCREWS

Hassall

Special nails, rivets, screws and threaded parts

WAA Adds Approved Dealers Licensed To Sell Surplus Material

Washington

• • • **From May 1 to 15,** inclusive, a total of 178 more "approved dealers" were licensed to solicit and negotiate sales of government-owned surplus machine tools and other production equipment under the agency-dealer plan for such surplus property, WAA has announced. This brings "approved dealers" signed under the government program to a total of 2187 through May 15.

ATLANTA

Concord Radio Corp., 265 Peachtree St., Atlanta
James L. Lunsford, 1064 Piedmont Ave., N E Atlanta
Associated Metals, 1001 William Oliver Bldg., Atlanta
E. H. Gray & Co., 1109 Powder Springs St., Marietta, Ga.

BOSTON

Southworth Machine Co., 30 Warren Ave., Portland, Maine

BIRMINGHAM

Manufacturers Agents Servie Co., 710 Brown Marx Bldg., Birmingham
McConnell Sales & Engineering Corp., 2809 Central Ave., Birmingham
J. A. Stearns, 829 Frank Nelson Bldg., Birmingham

CHICAGO

Terre Haute Heavy Hardware Co., Inc., 545 N 13th St., Terre Haute, Ind.
Harnischfeger Corp., 4400 W National Ave., Milwaukee
Joe Schuster Co., 1935 Arlington, Des Moines, Iowa
Martin Tool & Mfg. Corp., Carlisle, Ind.
Peter R. Logue & Co., Inc., 1831 S First St., Milwaukee
Engineering Service, Inc., 610 W Michigan St., Milwaukee
Calument Iron & Supply Co. of E Chicago, 200 W Chicago Ave., East Chicago, Ind.
Mid-Continent Products Co., 164 N Clinton St., Chicago
Manufacturers Machinery & Supply, 817 W Lake St., Chicago
Franken Sales Co., 1617 A Washington St., Manitowoc, Wis.
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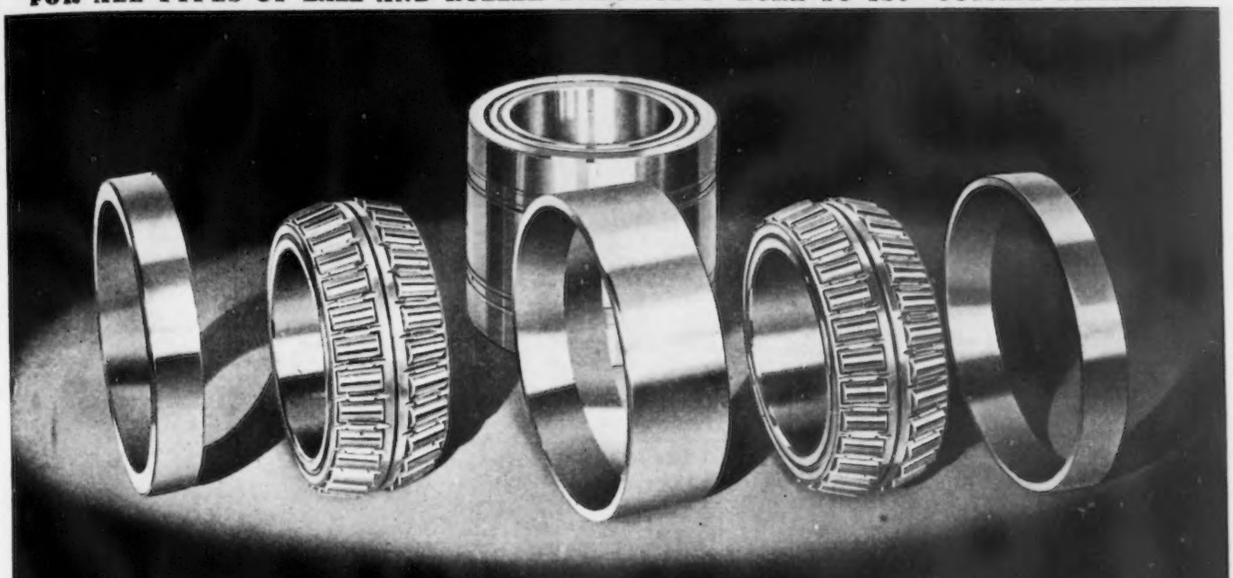

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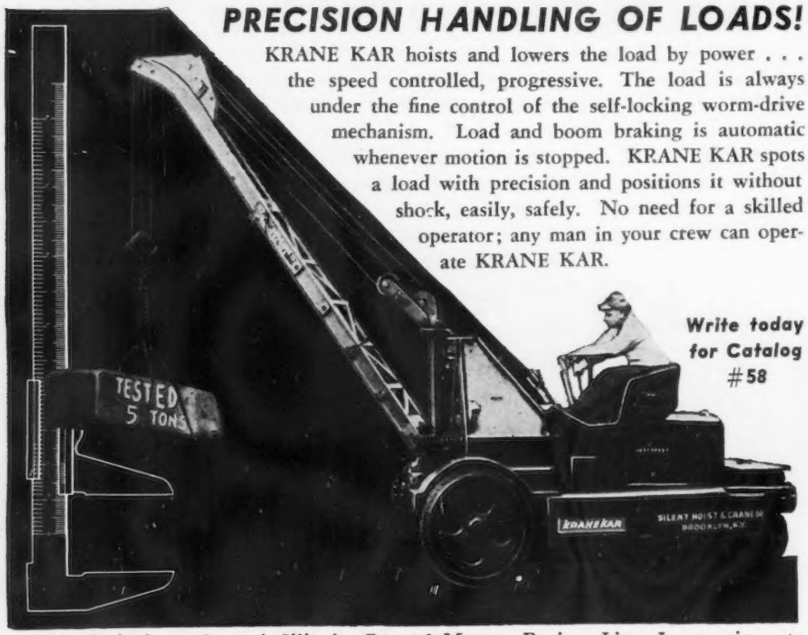

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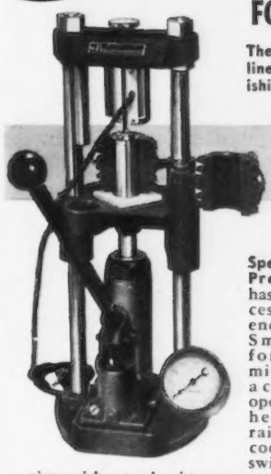
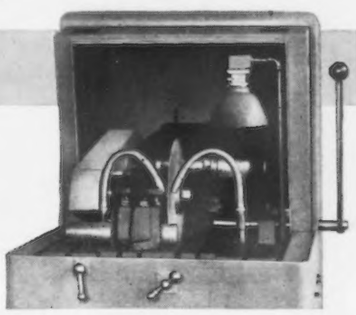
Buehler

SPECIMEN PREPARATION EQUIPMENT AND SUPPLIES FOR THE METALLURGICAL LABORATORY

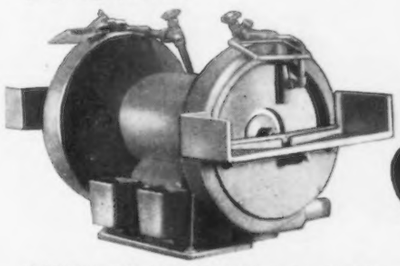
The items illustrated are selected from the complete Buehler line of equipment, tools and accessories for molding and finishing specimen mounts.



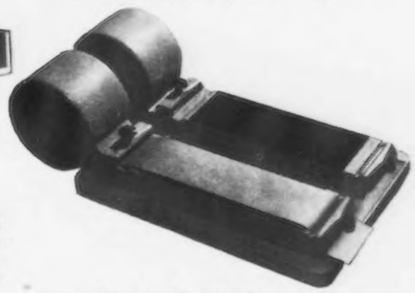
Specimen Mount Press No. 1315 has complete accessibility, no enclosed parts. Smooth performance permits speed and accuracy in operation. Solid heater can be raised and the cooling blocks swing into position without releasing pressure on the mold. This rapid cooling permits production of transoptic mounts in a few minutes. Shipping weight, 100 lbs.



Abrasive Cut-off Machine, Model No. 1000, is a solidly built, heavy duty piece of equipment free from sideplay or vibration with capacity for cutting specimen sections up to 3-1/2". Cutting is done on the front of the wheel and is controlled by a convenient outside lever. The driving motor is a totally enclosed ball bearing, 3 hp. with a separate motor driving the self-contained cooling system. Overall dimensions of cabinet 31" x 47" x 64". Shipping weight, 1400 lbs.



Wet Power Grinder No. 1210, powered with a 3/4 hp. totally enclosed ball bearing motor has two 12" water cooled wheels fitted with closed-in guards and non-shatterable shields. Suitable for coarse and medium grinding. Shipping weight, 310 lbs.



Hand Grinder No. 1410 is a most conveniently arranged two stage grinder. The grinding surfaces are 4-1/2" x 12-1/4" each with heavy 7/16" thick plate glass back. A reserve roll of 150 feet of emery paper is contained in drums for quick renewal of grinding surface. Base has gutter drains for surplus liquid in wet grinding operations. Shipping weight, 95 lbs.

Standard Polisher No. 1500. A complete unit with direct mounted 1/4 hp. radial thrust ball bearing motor. The 8" polishing disc is attached to a tapered arbor on the motor shaft by means of a stout sleeve. This sturdy construction and unusually smooth vibrationless operation helps to prevent pitting and amorphous film in polishing. The removable splash ring forms a convenient hand rest that aids the operator in precision work. A handy control lever on the mounted switch gives selective speeds of 575 and 1150 r.p.m. Shipping weight, 100 lbs.

Low Speed Polisher No. 1505-2, is particularly adapted to final stage polishing and for non-ferrous metal samples. The 8" disc is attached to a countershaft by a tapered sleeve with a long span between bearings, a construction feature that assures smooth operation. The selective speeds of 150 and 250 r.p.m. make this polisher perfectly adapted to the wax lap or lead lap polishing technique. Shipping weight, 105 lbs.

Either the standard or low speed polishers can be furnished in a single unit table model polisher No. 1516. A three unit table model No. 1540 is also available for maximum convenience in three stage polishing.

In the complete line of Buehler accessories and supplies for the metallurgical laboratory are found: Abrasive paper sheets, discs, and rolls in every grade • polishing solutions • polishing cloths • cut-off wheels and molding powders. Buehler service includes everything needed for preparing precision specimens from metallurgical samples, available from one reliable source.

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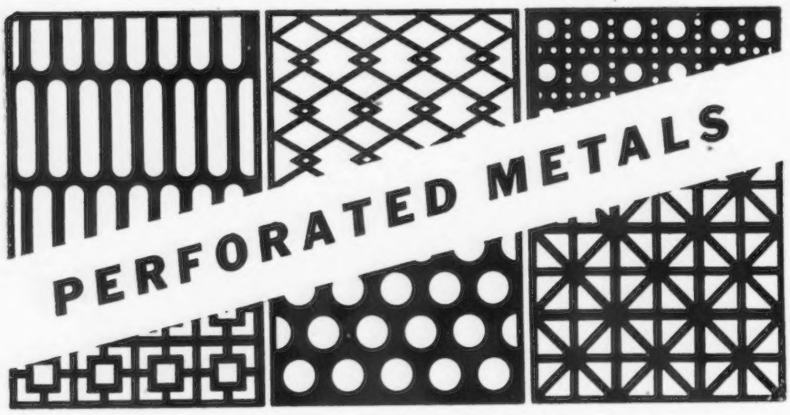

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Canada's Ingot Rate Shows Little Change

Toronto

• • • **While Canadian steel** production at 247,519 net tons in April showed little change from the month immediately preceding, it was well below the 274,213 tons reported for the corresponding month last year. Of the total output in April, 239,463 tons were steel ingots and 8058 tons steel castings.

During the month charges to steel furnaces included, 120,687 tons of pig iron; 77,026 tons of scrap of consumers' own make and 71,197 tons of purchased scrap.

For the four months ended Apr. 30, production of steel ingots and castings totaled 975,152 net tons compared with 1,070,860 tons for the corresponding period of 1945 and 1,008,402 tons in 1944.

Following are comparative monthly production figures in net tons for 1946:

	Steel Ingots	Castings
Jan.	236,479	8,144
Feb.	226,273	7,620
Mar.	240,589	8,528
Apr.	239,463	8,056
Total	942,804	32,348

French Version of WPB Scrapped by Assembly

Paris

• • • **Special trade** groups and trade associations established during the occupation of France to perform many of the functions borne by the War Production Board in America will be dissolved under the terms of a recent act by the French Constituent Assembly. The plan does not provide any permanent economic organization, but all laws concerning industrial organization and distribution are rescinded, and the assets of the dissolved "office professionel" will be transferred to appropriate government ministries or, in some cases, to parent trade federations.

Some type of organization will continue during the transition period before all controls and allocations of raw materials and products are rescinded.

The new control will be largely exercised voluntarily through trade associations in order to avoid government interference in so far as possible. Present plans call for primary allocations to be made by the ministries with the assistance of working parties who will determine the overall production of each industry and fix the quantities of controlled raw materials and products accordingly. The trade associations will then fix the allocations to individual firms. No details have been disclosed to date of the arrangements for establishing any provisional organizations, or exactly how the liquidation of the existing groups will be carried out.

Reforms Social Security

Paris

• • • **The French Social** Security Act passed recently, if applied immediately, would mean a cost of 40 billion francs ($336 million) per yr. The Minister of Labor has just stated that this reform would not come into operation until such a date as the average production level had reached 110 pct of the 1938 level as far as the old age insurance and old people's pensions were concerned, and 125 pct of that level as far as the other risks covered by the act were concerned.

Aluminum Bronze Rods extruded by Ampco

combine the basic advantages of Ampco alloys with the plus values of the extrusion method

You gain a double advantage when you use aluminum bronze rods — extruded by Ampco — for producing machined parts such as are illustrated.

(1.) Ampco aluminum bronze offers exceptional resistance to corrosion, wear, impact, and fatigue—and stands up under difficult conditions.

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At Ampco, two grades of Ampco Metal and two grades of Ampcoloy are regularly produced in extruded form. These rods, in a variety of sizes, are ready for immediate shipment . . . ready to help you give your customers a better product. Write for Bulletin 64A.

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It simply means—
More cleaning at much less cost.
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If cleaning grey iron, malleable iron, or steel drop forgings, we can save you money.

Let us prove it!

HARRISON ABRASIVE CORPORATION
Manchester, New Hampshire

The London Economist

(CONTINUED FROM PAGE 103)

councils, the New York organization being one of these.

THE Communists could not be dislodged without a bitter, protracted fight, and one none too certain of success. At best, such an internal fight would weaken the CIO, divert it from pressing industrial matters and greatly undermine its political strength. The AFL would enjoy watching the procedure. The Republican Party could be expected to bear the cost of the candles. The fight, however, is not forthcoming.

Yet there is tension in the situation. More and more, men in top CIO positions feel inconvenienced by what once seemed to be a marriage of convenience. The influential leaders of the textile, shipbuilding, steel, rubber and clothing workers' unions, to name heads of the largest units, are clearly not Communists. While men like Philip Murray and Sidney Hillman are willing to overlook a great deal for whatever economic and political advantages collaboration and "peace in the family" seem to bring, others, such as Emil Rieve (textile) and John Green (shipbuilding), are on the warpath. There is not one of them who can look with magnanimity at the recent efforts in a number of Communist-led units to build up power concentrations in politically sensitive areas. The recent merger of the two CIO unions of federal government employees and of state, county and municipal employees into a federation of government workers is one of these; another is the merger of the architects and technicians with the office and professional workers' organization, which already includes magazine writers, artists and other white-collar workers.

Still another, and by far the most significant, is the formation of a maritime federation which combines Harry Bridges' International Longshoremen & Warehousemen's Union with Joseph Curran's National Maritime Union, along with the American Communications Association, the National Union of Marine Cooks & Stewards, the National Maritime Engineers' Beneficial Association, all CIO, and the Independent Pacific Coast Firemen, Oilers, Watertenders & Wipers'

Union. The potential political significance of this setup in national and international terms, under its Communist guidance, is obvious.

TO sum up, the sojourn under one roof of the primarily-unionists with the above-all-Communists has not tended to strengthen mutual affection. However, there is no disposition toward a break-up. The Communists wish to stay where they are, the union is unwilling to force the issue. But adherence to the new party line is forcing the issue.

By considerations of union expediency and by personal commitment, Messrs Murray, Hillman and the others have—until the anti-strike law proposals — consistently supported the Administration, while the Communists have been castigating it with increasing violence. Now, solidarity may be saved by the President's apparent defection from Rooseveltian pro-labor policies, plus the support given by Murray and Hillman—more by the latter than the former—to the principle of peace at any price among the Big Three among the unions—Steel, Auto, Electrical Workers. Also, as progressive trade unionists, all CIO leaders dislike the business of penalizing unionists for "beliefs": they consider such a course ethically objectionable, unless a challenge of leadership is involved. It also interferes with the prerequisites of the closed shop. And among the opportunists there is always the hope that the Communist party line may change once again. An uneasy peace thus continues.

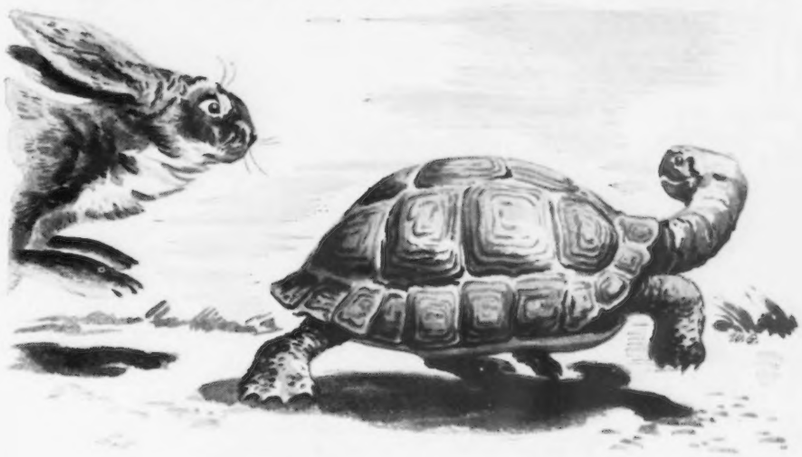
PFA Elects Officers

Pittsburgh

• • • **The Pittsburgh Foundrymen's** Assn. elected officers for the 1946-47 season. These officers are: M. J. Kellner, Westinghouse Electric Corp., president; A. M. Cadman, A. W. Cadman Mfg. Co., vice-president; Thomas E. Lloyd, THE IRON AGE, secretary-treasurer.

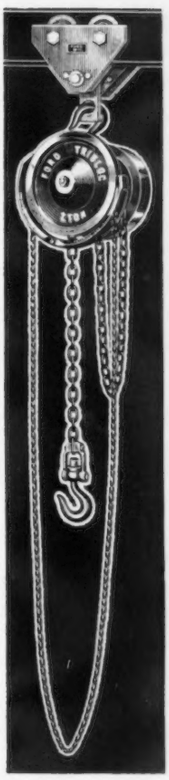
The executive committee elected consists of: H. P. Spilker, Sterrit Thomas Foundry Co.; C. B. Dick, Westinghouse Electric Corp.; N. J. Kelly, Kelly Foundry Co.; T. A. Reynolds, foundry consultant, and J. A. Meyer, National Alloy Steel Div., Blaw-Knox Co.

GET ALONG *FASTER!*



WITH

FORD TRIBLOCS



Here is a hoist especially built for constant hard usage. It is ideal where high-speed production counts. There are many reasons why this is true, but one of the chief reasons is the Ford Tribloc's simplicity of design. It has fewer parts than any other hoist in the field, and of course, fewer parts mean less opportunity for wear, greater efficiency, lower maintenance cost. When you buy a Ford Tribloc you get a simple, ruggedly durable hoist that will give fast, dependable service a long time. Capacities: 1/4 to 40 tons.

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PROCESS

By employing the Oakite CrysCoat Process for imparting a fine grain phosphate coating to the surfaces of ferrous rods and wire, die life is lengthened by as much as 150% and even 300%.

At the same time, production is increased since equipment down-time is reduced to a minimum. A better, more uniform appearance of wire is obtained. You will also find that recleaning and recoating are minimized, since the fine crystalline phosphate coating over the rods retards rusting.

Send for FREE Service Report describing methods of use . . . giving complete technical data. If you wish, a demonstration of the Oakite CrysCoat Process will gladly be arranged at your convenience. Write on your business stationery . . . there's no obligation.

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Chapter Elects Officers

Columbus, Ohio

• • • **At the annual** election of the Columbus Chapter of the American Society for Metals, held at the Fort Hayes Hotel, recently, the following officers were elected: Chairman, Chas. Lucks, Battelle Memorial Institute; vice-chairman, Walter Hobbs, Ranco, Inc.; treasurer, Dr. Mars G. Fontana, Ohio State University; secretary, R. Ernest Christin, Columbus Bolt Works Co.

Executive Committee: Ray H. Frank, Bonney Floyd Co.; Ernest Kron, Battelle Memorial Institute; E. K. Fry, Curtiss-Wright Corp.; Glen Krouse, Krouse Testing Machine Co.; Samuel Krumm, Buckeye Steel Castings Co.; Karl G. Presser, National Supply Co., Springfield, Ohio; Samuel Yost, Jeffrey Mfg. Co.; C. C. Hoffman, Timken Roller Bearing Co.; Olin Outledge, Columbus Steel Treating Co.; Jos. Scandling, Marion Steam Shovel Co., Marion, Ohio; Haswell Staehle, Surface Combustion Co.; Karl Stinson, Ohio State University.

Celebrates Centennial

• • • **Wheelock, Lovejoy & Co.,** Inc. Cambridge, Mass., is this year celebrating the 100th anniversary of its founding. The firm began as a partnership, dealing in "metals of all kinds," with a yard near the Boston waterfront. Here, as a booklet commemorating the centennial explains, iron was imported from Sweden and steel from England, while copper was exported.

The original partnership was succeeded by six others until the firm was incorporated under its present name in 1919. A. Oram Fulton, who has headed the company since 1924, was employed in 1910 to work on special alloy steels. Mr. Fulton's work led to the development of the widely known "Hy-Ten" brand of alloy steels in which the company specializes today.

"1846—One hundred years of continuous service to industry—1946"

S.A.E. HY-TEN A.I.S.I.

ALLOY STEELS

A century of experience in the development and application of special steels for PRODUCTION, TOOL ROOM, MAINTENANCE.

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WHEELOCK, LOVEJOY & COMPANY, INC.
126 Sidney Street Cambridge 39, Mass.
Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32

Weekly Gallup Polls

[CONTINUED FROM PAGE 99]

refrigerator, a new washing machine for his wife, etc. On the other hand, the man who fears he may soon be among the unemployed will hold onto his dollars.

The general spirit of optimism which continues to prevail among workers, in spite of strikes and shutdowns for lack of materials, is thus encouraging for the general economic outlook—at least for the immediate future.

The poll of workers throughout the nation was conducted with the use of this question:

"During the next year do you think there is any chance that you will be unemployed?"

The replies:	Pct
There is a great chance	9
There is only a slight chance	21
There is no chance	55
Don't know	15

Business and professional people and farmers—many of whom are self-employed—show little worry about employment during the next year.

It is interesting that among manual laborers, where the threat of unemployment looms largest in the minds of the workers, membership in a union appears to offer no comfort whatsoever. Just as many union members think there is a great chance of their being thrown out of work during the year as is the case with all manual workers. The same holds true for the proportion in both groups who think there is a slight chance they may be without jobs.

Here are tables showing replies to the poll question by occupation, and by union-members as contrasted to all workers.

	Prof. & Bus. Pct	White Collar Pct	Farmers Pct
There is a great chance	5	9	4
There is only a slight chance	14	21	11
No chance	69	58	76
Don't know	12	12	9

	Manual Workers	
	All Manual Workers Pct	Union Members Pst
There is a great chance	14	14
There is only a slight chance	29	29
No chance	38	41
Don't know	19	16

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Abbott is "right in the swing" of things . . . new equipment . . . more floor space . . . more machines! The nation's all-out production schedule has increased the demand for Abbott Bearing Balls more than ever . . . We're working night and day . . . doing everything we can to meet this demand . . . we're leaving no stone unturned to keep Abbott Bearing Balls rolling to you.

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ROLL ON ABBOTT Bearing BALLS

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EXPERIENCE and ability acquired in thousands of installations are at your service when selecting D. S. M. equipment.

D. S. M. case histories have been derived from equipment furnished to plants throughout U. S. A. and to Dagenham, England; Clichy, France; Bombay, India; Batavia, D. E. I.; Sao Paula, S. A.; Turin, Italy; etc. D. S. M. equipment means rapid cross flow circulation for speedy and uniform drying or baking. This eliminates case hardened products.

If you wish to convert your present system to the new postwar economy, it will be to your advantage to try our Go-Out Plan. This means that you will enjoy the services of our highly experienced engineers, who will personally inspect your system and work together with the various departments in your plant in need of special help. Their recommendations for whatever new installations may be required will place you in a position to secure a layout that will more than justify your outlay.

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PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

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